United States Department of Agriculture

Soil Conservation Service

In cooperation with North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Harnett County Board of Commissioners; and Harnett County Soil and Water Conservation District

Soil Survey of Harnett County, North Carolina

How To Use This Soil Survey

General Soil Map

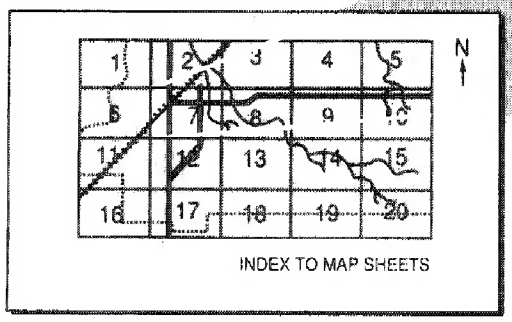
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

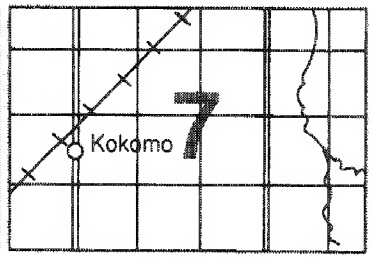
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

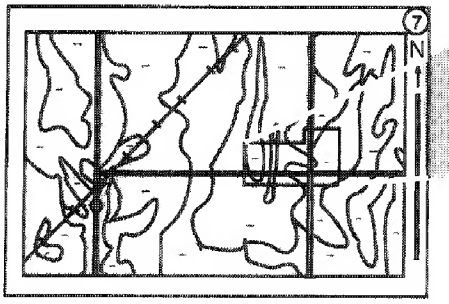


INDEX TO MAP SHEETS

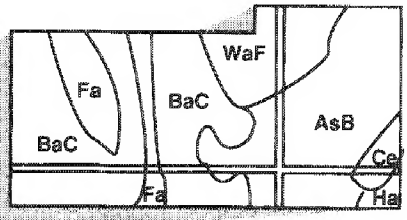


MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the North Carolina Agricultural Research Service, and local agencies. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1984. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This soil survey was made cooperatively by the Soil Conservation Service and the North Carolina Department of Environment, Health, and Natural Resources; the North Carolina Agricultural Research Service; the North Carolina Cooperative Extension Service; and the Harnett County Board of Commissioners. It is part of the technical assistance furnished to the Harnett County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

The first soil survey of Harnett County was published in 1917 by the U.S. Department of Agriculture. This survey updates the first survey, provides more detailed maps on aerial photographs, and contains more interpretive information *(7)*.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: The Cape Fear River in an area of the Roanoke-Wickham-Altavista general soil map unit. It significantly influences the development of soils and the landscape. It drops in elevation from about 135 feet above sea level at the Lee County-Chatham County line to about 50 feet at the Cumberland County line.

Contents

Issued September 1994

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Harnett County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow over bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the North Carolina Cooperative Extension Service.

Coy A. Garrett
State Conservationist
Soil Conservation Service

Soil Survey of Harnett County, North Carolina

By Daniel G. Spangler, Soil Conservation Service

Soils surveyed by Daniel G. Spangler, Joseph T. Lyon, III, Robert H. Ranson, Jr., Timothy P. Sexton, Berman D. Hudson, and James Dunn, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
North Carolina Department of Environment, Health, and Natural Resources; North Carolina Agricultural Research Service; North Carolina Cooperative Extension Service; Harnett County Board of Commissioners; and Harnett County Soil and Water Conservation District

HARNETT COUNTY is in the central part of North Carolina (fig. 1). In 1987, it had a population of about 65,200, which is 9.5 percent larger than in 1980 *(15)*. It has a surface area of 384,966 acres, or about 602 square miles. The county seat is Lillington.

The county is in the Piedmont Plateau and Coastal Plain physiographic areas. The Piedmont Plateau area is underlain by phyllite, crystalline schist, and granite. The Coastal Plain area is of more recent age and is underlain by unconsolidated gravel, sand, silt, and clay.

Elevation ranges from about 50 feet above sea level on the Cape Fear River at the Cumberland County line to about 490 feet on Big Ridge, 2 miles east of the Moore County line on North Carolina Highway 27.

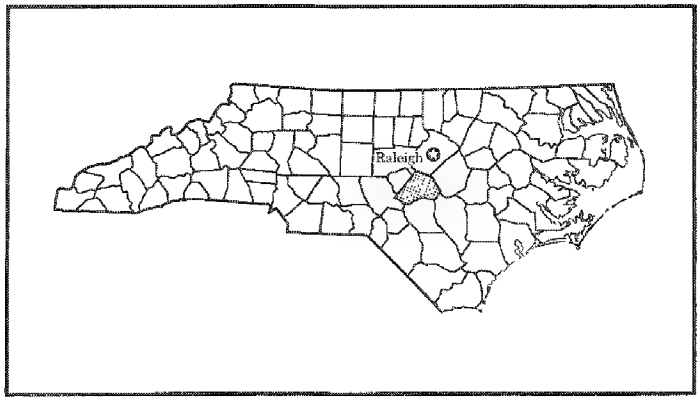


Figure 1.—Location of Harnett County in North Carolina.

General Nature of the County

This section gives general information concerning Harnett County. It describes history and development; physiography, relief, and drainage; and climate.

History and Development

Harnett County is in the central part of North Carolina between Raleigh and Fayetteville. It has a land area of about 384,710 acres. Of this total, approximately 109,200 acres is used for agriculture. The Cape Fear River divides the county about in half.

The county was organized in 1855 from a part of Cumberland County. The original settlers were Scottish, who immigrated directly from Scotland, and Welsh. These settlers first located along the Cape Fear, Upper Little, and Lower Little Rivers *(6)*.

Harnett County is basically rural and has an agriculturally based economy. In 1910, the population was 22,174. In 1987, the population was about 65,200. Because of increased staffing at Fort Bragg and Pope Field Air Base in Cumberland County, the population of the southwestern part of Harnett County greatly increased in the 1970's and 1980's. Six small towns are in the county. Dunn is the largest.

In 1987, about 875 farms were in the county and the average farm size was about 159 acres *(14)*.

Conservation efforts are hindered because many farmers manage two or more farms, which they usually lease for only one season. Because farmers may not manage a given tract of land for more than one growing season, they may be unable to spend resources on conservation. The landowner also may not be willing to make improvements on the farm because the tenant might alter or destroy the conservation practice that was installed.

A few small manufacturing plants are in the county. The largest single employer in the county makes denim cloth and employs about 1,600 people. A metro water district was formed, and a new water plant was built in Lillington. Water lines extend from the plant to Angier, Coats, and Buies Creek. A county airport was completed in 1980.

Two major gravel companies in the county have mined about 3,700 acres, mostly before the North Carolina Mining Law required the land to be reclaimed. The gravel deposits are located within two miles of the Cape Fear River. They are between Lillington and the county line.

Most areas in the county have easy access to major roads. Interstate 95 crosses the eastern edge of the county. U.S. Highway 421 and North Carolina Highway 27 cross the county from east to west. U.S. Highway 401 and North Carolina Highways 210 and 55 cross the county from north to south.

Physiography, Relief, and Drainage

The two major types of parent material in Harnett County developed from bedrock and from sediments derived from unconsolidated materials. The unconsolidated sediments generally range from a few feet to more than 200 feet in thickness. The bedrock is exposed on both sides of the Cape Fear River, Upper Little River, and tributaries in the western part of the county.

The two major physiographic regions in the county are the Piedmont Plateau and the Coastal Plain, which can be subdivided into the Sandhills Coastal Plain, the Upper Coastal Plain, and the Middle Coastal Plain.

In the Piedmont Plateau region, the soils formed in material weathered from bedrock. Relief is rolling to hilly and is steep near drainageways. Elevation ranges from about 200 to 400 feet.

Elevation in the Sandhills Coastal Plain region ranges from about 270 to 490 feet. The sandhills are characterized by broad, sandy ridges and long, less sandy side slopes. Many streams have cut deeply into the sediments, and thus upland areas tend to drain rapidly, even during extended wet periods.

Elevation in the Upper Coastal Plain region ranges from 265 feet to more than 400 feet. This area has broad, level ridgetops and sloping side slopes. Streams have cut into the sediments, and thus this area tends to drain as rapidly as the Sandhills Coastal Plain region.

Elevation in the Middle Coastal Plain region ranges from about 150 feet in the eastern part of the county to 265 feet in the western part. This area is gently undulating. Streams are not as extensive and have not cut as deeply into the sediments as in the other subdivisions of the Coastal Plain region, and thus surface drainage in the Middle Coastal Plain is less well developed. Areas near the center of broad ridges may drain slowly after heavy rains or have a permanent high water table.

The most striking geologic feature of the Middle Coastal Plain in the county is the Carolina bays, which are oval depressions ranging in size from less than 1 acre to more than 80 acres. The long axis of these bays is oriented northwest to southeast. A sandy rim is on the southeastern end of each bay. Generally, the larger the bay, the more sandy and pronounced the rim. Most of the bays in the county have been drained and are used as cropland. Most of the undrained bays are wet throughout the year.

The terraces along the Cape Fear River, the Upper Little River, and the Lower Little River are another important surficial feature. They formed as the rivers meandered across the landscape over an extended period of time. The rivers are now entrenched and occupy a narrow channel more than 40 feet below the original terrace. This entrenchment created steep bluffs above the rivers. The bluffs are dissected by numerous deep, shaded ravines. The bluffs and ravines support vegetation that is analogous to mountain vegetation. For example, beech, maple, American hornbeam, eastern hophornbeam, pawpaw, and serviceberry are common.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Dunn, North Carolina, in the period 1962 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 43 degrees F and the average daily minimum temperature is 31 degrees. The lowest temperature on record, which occurred at Dunn on January 21, 1985, is -4 degrees. In summer, the average temperature is 77 degrees and the average daily maximum temperature is 87 degrees. The highest recorded temperature, which occurred at Dunn on August 22, 1983, is 108 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 47.2 inches. Of this, 26 inches, or 55 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 20 inches. The heaviest 1-day rainfall during the period of record was 6.06 inches at Dunn on October 4, 1964. Thunderstorms occur on about 40 days each year.

The average seasonal snowfall is about 2 inches. The greatest snow depth at any one time during the period of record was 5 inches. On an average of 1 day a year at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in spring.

Every few years in winter, heavy snow covers the ground for a few days to a week. Every few years in late summer or in autumn, a tropical storm moving inland from the Atlantic Ocean causes extremely heavy rains for 1 to 3 days.

How This Survey Was Made

This survey was made to provide information about the soils in Harnett County. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They studied many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Soils occur in an orderly pattern that results from the combined influence over time of climate, parent material, relief, and plants and animals. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. This model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify the soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. The data from these analyses and tests and from field-observed characteristics and soil properties are used to predict behavior of the soils under different uses. Interpretations are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and

from field or plot experiments on the same kinds of soil.

Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a relatively high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will be at a specific level in the soil on a specific date.

Soil boundaries are drawn on aerial photographs and each delineation is identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in accurately locating boundaries.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called minor soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are identified in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Gilead-Blaney-Candor

Nearly level to strongly sloping, moderately well drained to somewhat excessively drained soils that have a loamy or clayey subsoil; on uplands

This unit is in the southern and western parts of the county, in the Sandhills area. It is on long slopes and broad sandy ridges.

This unit makes up about 27 percent of the county. It is about 30 percent Gilead soils, 28 percent Blaney soils, 11 percent Candor soils, and 31 percent soils of minor extent. The minor soils are Vaucluse and Lakeland soils in the uplands and Bibb, Wehadkee, and Roanoke soils along streams.

The nearly level to strongly sloping, moderately well drained Gilead soils are on side slopes and toe slopes. Typically, the surface layer is pale brown loamy sand. The upper part of the subsoil is brownish yellow, firm, brittle sandy clay loam. The next part is reddish yellow and brownish yellow, firm, brittle sandy clay. The lower part is brownish yellow sandy clay loam that has white mottles.

The gently sloping and strongly sloping, well drained Blaney soils are on side slopes. Typically, the surface layer is grayish brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The subsoil is light yellowish brown and brownish yellow sandy clay loam. It is firm when moist and brittle when dry and is mottled in the lower part.

The nearly level to strongly sloping, somewhat excessively drained Candor soils are on broad ridges and on side slopes. Typically, the surface layer is dark grayish brown sand. The subsurface layer is yellowish brown sand. The upper subsoil is yellowish brown loamy sand. The intermediate layer is yellow sand. The lower subsoil is reddish yellow sandy clay loam.

The soils on ridges and the less sloping side slopes are used mainly for cultivated crops. The soils on the steeper side slopes are used as woodland.

The less sloping areas of the Gilead and Blaney soils are suited to cultivated crops, such as corn and soybeans. The Candor soils on the steeper side slopes are poorly suited to cultivated crops. Droughtiness is the main limitation in areas of the Blaney and Candor soils. Erosion is a hazard in areas of the Gilead soils.

The major soils are well suited to grasses, such as coastal bermudagrass and bahiagrass, for hay and pasture. The droughtiness is a limitation in areas of the Candor soils.

The major soils are suited to woodland. The droughtiness and the sandy surface layer are the main limitations. Longleaf pine and loblolly pine are the dominant species. Although productivity is low in areas of the Blaney and Candor soils, few significant limitations affect woodland use and management. The construction of access roads and firebreaks, however, causes serious erosion in some wooded areas.

This unit is fairly suited to most urban uses. Slow permeability and wetness in the Gilead soils and slow permeability in the Blaney soils, however, are severe limitations affecting onsite sewage disposal.

2. Dothan-Fuquay-Gilead

Nearly level to strongly sloping, well drained and moderately well drained soils that have a loamy or clayey subsoil; on uplands

This unit is in the northeastern and western parts of the county in areas that are at an elevation of more

than 265 feet. It is on broad uplands that have numerous short side slopes.

This unit makes up about 22 percent of the county. It is about 28 percent Dothan soils, 20 percent Fuquay soils, 12 percent Gilead soils, and 40 percent soils of minor extent. The minor soils are Cecil, Lillington, Norfolk, Orangeburg, Pacolet, Pocalla, and Wagram soils in the uplands and Bibb soils along streams.

The nearly level and gently sloping, well drained Dothan soils are on broad divides in the uplands. Typically, the surface layer is brown loamy sand. The subsurface layer is pale yellow loamy sand. The subsoil is yellowish brown and brownish yellow sandy clay loam in the upper part and mottled yellowish brown, very pale brown, and red sandy clay loam in the lower part. The lower part has about 15 percent nodules of plinthite and is firm and brittle.

The nearly level and gently sloping, well drained Fuquay soils are on broad ridges in the uplands. Typically, the surface layer is dark grayish brown loamy sand. The subsurface layer is very pale brown loamy sand. The subsoil is yellowish brown sandy loam in the upper part; brownish yellow and mottled red, strong brown, and gray sandy clay loam in the next part; and brownish yellow, mottled sandy clay loam in the lower part. The lower part has about 20 percent nodules of plinthite and is hard and brittle.

The nearly level to strongly sloping, moderately well drained Gilead soils are on side slopes and toe slopes. Typically, the surface layer is pale brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The upper part of the subsoil is brownish yellow, firm, brittle sandy clay loam. The next part is reddish yellow and brownish yellow, firm, brittle sandy clay. The lower part is brownish yellow sandy clay loam that has white mottles.

Most of this unit is used for cultivated crops, such as corn, soybeans, and tobacco, or for pasture. Many of the steeper areas are wooded.

The Dothan soils are well suited to cultivated crops and pasture, and the Fuquay and Gilead soils are suited. Droughtiness is a limitation in areas of the Fuquay soils. Wetness is a limitation in areas of the nearly level Gilead soils. Erosion is a hazard in the more sloping areas of the Dothan and Gilead soils.

The Dothan and Gilead soils are well suited to trees, such as loblolly pine and longleaf pine, and the Fuquay soils are suited.

This unit is suited to most urban and recreational uses. The Dothan and Gilead soils, however, have severe limitations affecting onsite sewage disposal. In the lower part of the subsoil, the Dothan soils are slowly permeable and have a perched water table. The Gilead soils are slowly permeable and wet.

3. Norfolk-Wagram-Rains

Nearly level to strongly sloping, well drained and poorly drained soils that have a loamy subsoil; on uplands

This unit is in the southern and southeastern parts of the county in areas that are at an elevation of less than 265 feet. It is on broad uplands that have numerous wet flats and depressions.

This unit makes up about 21 percent of the county. It is about 44 percent Norfolk soils, 8 percent Wagram soils, 6 percent Rains soils, and 42 percent soils of minor extent. The minor soils are Goldsboro, Lynchburg, Marlboro, Orangeburg, and Vaucluse soils in the uplands and Bibb and Wehadkee soils along the larger streams.

The nearly level and gently sloping, well drained Norfolk soils are on broad ridges. Typically, the surface layer is brown loamy sand. The subsurface layer is light yellowish brown loamy sand. The subsoil is brownish yellow sandy loam in the upper part; yellowish brown and strong brown sandy clay loam in the next part; and mottled strong brown, red, and light gray sandy clay loam in the lower part.

The nearly level and gently sloping, well drained Wagram soils are on broad ridges. They are frequently intermingled with areas of Norfolk soils. Typically, the surface layer is brown loamy sand. The subsurface layer is very pale brown loamy sand. The upper part of the subsoil is brownish yellow sandy loam and sandy clay loam. The next part is strong brown sandy clay loam. The lower part is mottled brown, light gray, and red sandy clay loam.

The nearly level, poorly drained Rains soils are in shallow depressions and on low flats. They are below the Norfolk and Wagram soils on the landscape. Typically, the surface layer is dark gray sandy loam. The subsoil is gray, mottled sandy clay loam or sandy loam.

Most of this unit is used for cultivated crops, such as corn, cotton, soybeans, sweet potatoes, and tobacco, or for pasture. Many of the wetter areas are wooded.

The Norfolk soils are well suited to cultivated crops and pasture, and the Wagram and Rains soils are suited. Droughtiness is a limitation in areas of the Wagram soil. Wetness is a limitation in areas of the Rains soil. Erosion is a hazard in the more sloping areas of the Norfolk soil.

The Norfolk and Rains soils are well suited to trees, such as loblolly pine, and the Wagram soils are suited.

The Norfolk soils are well suited to urban and

recreational uses. The Wagram soils are well suited to urban uses and suited to recreational uses. The Rains soils are poorly suited to most urban and recreational uses. Wetness is the main limitation.

4. Cecil-Pacolet-Nason

Gently sloping to moderately steep, well drained soils that have a clayey subsoil; on uplands

This unit is in the northwestern and western parts of the county, west of Lillington. It is on narrow ridges and long, steep slopes along the Cape Fear River and the Upper Little River.

This unit makes up about 13 percent of the county. It is about 55 percent Cecil soils, 16 percent Pacolet soils, 7 percent Nason soils, and 22 percent soils of minor extent. The minor soils are Enon, Helena, Lillington, Louisa, and Orangeburg soils in the uplands and Roanoke and Wehadkee soils along the larger streams.

The gently sloping and strongly sloping Cecil soils are on convex ridgetops and side slopes. Typically, the surface layer is brown fine sandy loam. The subsurface layer is reddish yellow fine sandy loam. The subsoil is red. It is clay loam in the upper part, clay in the next part, and clay loam in the lower part.

The moderately steep Pacolet soils are on side slopes above the streams. Typically, the surface layer is grayish brown fine sandy loam. The subsurface layer is pale brown fine sandy loam. The subsoil is yellowish red or red clay or clay loam. The underlying material to a depth of 60 inches is soft, multicolored schist that readily crushes to fine sandy loam.

The strongly sloping and moderately steep Nason soils are on side slopes above the streams. Typically, the surface layer is brown silt loam. The subsoil is strong brown clay and silty clay loam. It extends to a depth of about 34 inches. The underlying material to a depth of 60 inches is soft or hard, multicolored rock that crushes to silt loam.

Most of this unit is used as woodland. Areas that have been cleared of trees are used for cultivated crops, such as corn, soybeans, and tobacco, or for pasture.

The major soils are suited to most of the crops grown in the county but generally are not cultivated because of a severe hazard of erosion. Erosion is not a hazard in pastured areas if the plant cover is maintained. The slope may limit the use of equipment in some areas.

This unit is well suited to trees, such as loblolly pine, Virginia pine, and a variety of oaks. The construction of access roads and firebreaks causes serious erosion in some wooded areas.

This unit is suited to most urban and recreational uses. The slope, low strength, and the clayey material in the subsoil are the main limitations.

5. Bibb-Wehadkee

Nearly level, poorly drained soils that have loamy and sandy underlying layers; on flood plains

This unit is on narrow flood plains along Mingo Swamp, Black River, Cape Fear River, Upper Little River, Lower Little River, and Anderson Creek.

This unit makes up about 9 percent of the county. It is about 47 percent Bibb soils, 21 percent Wehadkee soils, and 32 percent soils of minor extent. The minor soils are Augusta, Congaree, Chewacla, Portsmouth, and Roanoke soils.

Typically, the surface layer of the Bibb soils is dark grayish brown loam. The underlying material is dark gray and gray sandy loam in the upper part and light gray loamy sand in the lower part.

Typically, the surface layer of the Wehadkee soils is dark brown loam. The subsoil is gray silt loam in the upper part; light gray, mottled silt loam in the next part; and gray, mottled silty clay loam in the lower part. The underlying material is mottled yellow, pale brown, and light gray, stratified fine sandy loam and fine sand.

Almost all of this unit is woodland. Common species are sweetgum, yellow-poplar, willow oak, and water oak. The unit is well suited to trees, such as loblolly pine, sweetgum, and yellow-poplar.

This unit is poorly suited to most agricultural, urban, and recreational uses. Wetness and flooding are the main limitations.

6. Roanoke-Wickham-Altavista

Nearly level to strongly sloping, well drained to poorly drained soils that have a loamy or clayey subsoil; on stream terraces

This unit is in the southern and south-central parts of the county along the Cape Fear River south of Lillington and along the Upper Little River and Lower Little River. It is in broad level areas that have numerous wet depressions.

This unit makes up about 5 percent of the county. It is about 50 percent Roanoke soils, 20 percent Wickham soils, 15 percent Altavista soils, and 15 percent soils of minor extent. The minor soils are Alpin, Augusta, Pactolus, Polawana, Portsmouth, State, and Wahee soils on the terraces and Congaree and Chewacla soils along the rivers.

The nearly level, poorly drained Roanoke soils are below the Wickham and Altavista soils on the landscape. Typically, the surface layer is grayish brown loam. The upper part of the subsoil is grayish brown

clay loam and loam. The lower part is light gray clay loam. The underlying material is light gray loamy sand stratified with gravel.

The nearly level to strongly sloping, well drained Wickham soils are on the highest parts of the landscape. Typically, the surface layer is brown fine sandy loam. The upper part of the subsoil is yellowish red sandy clay loam and fine sandy loam. The next part is strong brown gravelly fine sandy loam. The lower part is reddish yellow fine sandy loam. The underlying material is reddish yellow and yellowish red sand.

The nearly level, moderately well drained Altavista soils are below the Wickham soils on the landscape and above the Roanoke soils. Typically, the surface layer is gray fine sandy loam. The subsoil is brownish yellow sandy clay loam in the upper part; pale brown, mottled sandy clay loam in the next part; and mottled light gray, pale brown, and brownish yellow sandy loam in the lower part.

Most areas of the Wickham and Altavista soils are used for cultivated crops. Although some areas have been cleared of trees and drained, most areas of the Roanoke soil support native hardwoods and pines.

The Wickham and Altavista soils are well suited to cultivated crops, and the Roanoke soils are suited. A drainage system is needed in areas of the Roanoke soils for optimum production. Erosion is a hazard in the more sloping areas of the Wickham soils. These soils are well suited to grasses and legumes for hay and pasture.

The major soils are well suited to trees, such as loblolly pine, sweetgum, and yellow-poplar.

The Wickham and Altavista soils are suited to most urban and recreational uses. The Roanoke soils are poorly suited to urban and recreational uses because of flooding and wetness.

7. Exum-Aycock-Nahunta

Nearly level and gently sloping, somewhat poorly drained to well drained soils that have a loamy subsoil; on uplands

This unit is in the south-central part of the county, south of Lillington and east of Bunnlevel, in an area locally known as "Flatwoods." It is on broad level uplands that have numerous wet flats.

This unit makes up about 3 percent of the county. It is about 21 percent Exum soils, 20 percent Aycock soils, 19 percent Nahunta soils, and 40 percent soils of minor extent. The minor soils are Coxville, Gilead, Goldsboro, Grantham, Marlboro, and Norfolk soils in the uplands and Bibb, Roanoke, and Wehadkee soils along the larger streams.

The nearly level, moderately well drained Exum soils are in broad areas that are slightly lower on the landscape than the Aycock soils. Typically, the surface layer is brown very fine sandy loam. The subsoil is clay loam. It is yellowish brown in the upper part; yellowish brown and mottled in the next part; and mottled red, gray, and strong brown in the lower part.

The nearly level and gently sloping, well drained Aycock soils are in broad areas that are slightly higher on the landscape than the Exum soils. Typically, the surface layer is grayish brown silt loam. The subsurface layer is very pale brown silt loam. The subsoil is silty clay loam. It is yellowish brown in the upper part and mottled red, brownish yellow, and light gray in the lower part.

The nearly level, somewhat poorly drained Nahunta soils are on broad flats and in shallow depressions. Typically, the surface layer is very dark gray loam. The subsurface layer is pale brown loam. The upper part of the subsoil is light yellowish brown and brownish yellow silty clay loam that has many gray mottles. The lower part is light gray silty clay loam that has prominent yellowish brown mottles.

The Exum and Aycock soils are well suited to cultivated crops and pasture, and the Nahunta soils are suited. Wetness is a limitation in areas of the Exum and Nahunta soils. Erosion is a hazard in the more sloping areas of the Aycock soils.

This unit is well suited to trees, such as loblolly pine, sweetgum, and yellow-poplar.

The Aycock soils are well suited to urban and recreational uses, the Exum soils are suited, and the Nahunta soils are poorly suited. The Exum and Nahunta soils have severe limitations affecting onsite sewage disposal. Wetness is the main limitation.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of the dominant soils within the map unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under the heading "Use and Management of the Soils."

The map units on the detailed soil maps represent areas on the landscape and consist mainly of the dominant soils for which the units are named.

Symbols identifying the soils precede the map unit names in the map unit descriptions. The descriptions include general facts about the soils and give the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are named as phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Norfolk loamy sand, 0 to 2 percent slopes, is a phase of the Norfolk series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more contrasting soils or miscellaneous land areas in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Norfolk-Urban land complex, 0 to 6 percent slopes, is an example.

An *undifferentiated group* is made up of two or more dominant soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Chewacla and Congaree loams, frequently flooded, is an undifferentiated group in this survey area.

Many of the areas mapped as an undifferentiated group have limited accessibility and field examinations were made at points of access from roads and trails. In most areas, the map units are too narrow at the scale selected in mapping to delineate the individual soils. Soil boundaries have been plotted by photo interpretations, the use of stereoscopes, and by direct observation.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits-Dumps complex is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The "Glossary" defines many of the terms used in describing the soils.

AnB—Alpin sand, 0 to 6 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, excessively drained Alpin and similar soils on terraces along the larger streams and rivers.

Mapped areas are generally long and narrow and range from about 25 to 100 acres in size.

Typically, the surface layer is brown sand 5 inches thick. The subsurface layer is 33 inches thick. The upper part is light yellowish brown sand, and the lower part is brownish yellow fine sand. Next is 36 inches of very pale brown sand that has thin layers of yellowish brown sandy loam. The underlying material to a depth of 86 inches is mottled yellow and white sand.

Permeability is very rapid. Available water capacity is very low. Reaction is very strongly acid to slightly acid, except where the surface layer has been limed.

Included in mapping are small areas of Pactolus and Augusta soils. The moderately well drained or somewhat poorly drained Pactolus soils are in narrow depressions. The somewhat poorly drained Augusta soils are in narrow, wet drainageways. Included soils make up about 15 percent of the map unit.

Most of this map unit is native forest. A small acreage is used for cultivated crops or pasture.

This map unit is poorly suited to cultivated crops and is moderately suited to hay and pasture. Droughtiness, leaching of plant nutrients, and soil blowing are the main limitations. Applications of fertilizer, conservation tillage, cover crops, crop residue management, and windbreaks help to control soil blowing, conserve soil moisture, and improve yields.

This map unit is well suited to woodland. The dominant native trees are loblolly pine, longleaf pine, turkey oak, bluejack oak, and blackjack oak. The main understory species include American holly, redbay, hickory, black cherry, sassafras, waxmyrtle, and hawthorn. The equipment limitation and seedling mortality are the main management concerns.

This map unit is moderately suited to most urban uses. Lawns and shrubs are difficult to establish and maintain because of the leaching of plant nutrients and the droughtiness. Seepage and the instability of ditchbanks and trench walls are limitations. The contamination of ground water is a hazard in areas used for septic tank absorption fields. The unit is poorly suited to most recreational uses because of the sandy texture.

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

AtA—Altavista fine sandy loam, 0 to 3 percent slopes, rarely flooded. This map unit consists mainly of nearly level, very deep, moderately well drained Altavista and similar soils on terraces along the Cape Fear, Upper Little, and Lower Little Rivers. Mapped areas are irregular in shape and range from about 5 to 25 acres in size.

Typically, the surface layer is gray fine sandy loam 8 inches thick. The subsoil is 38 inches thick. The upper part is brownish yellow sandy clay loam. The next part is pale brown sandy clay loam that has light gray and brownish yellow mottles. The lower part is mottled light gray, pale brown, and brownish yellow sandy loam. The underlying material to a depth of 60 inches is mottled light gray, pale brown, and brownish yellow loamy sand and fine sand.

Permeability is moderate. Available water capacity also is moderate. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 1.5 to 2.5 feet from December through March. This soil is subject to rare flooding for brief periods.

Included in mapping are small areas of the well drained State soils and the somewhat poorly drained Augusta and Wahee soils. State soils are on narrow ridges. Wahee and Augusta soils are in shallow depressions and along drainageways. Included soils make up about 15 percent of the map unit.

Most of this map unit is used for cultivated crops. A few small areas are used as sites for dwellings or for other kinds of urban development. The remaining acreage is mainly pasture or woodland.

This map unit is well suited to cultivated crops, such as corn, soybeans, small grain, and tobacco. In places a drainage system is needed for optimum production of tobacco or other moisture-sensitive crops.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant native trees are loblolly pine, sweetgum, white oak, water oak, and southern red oak. The main understory species include holly and sourwood.

This map unit is poorly suited to most urban uses because of the wetness and the flooding. It is suitable for recreational uses, but the wetness may be a limitation.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

Au—Augusta fine sandy loam, rarely flooded. This map unit consists mainly of nearly level, very deep, somewhat poorly drained Augusta and similar soils on low stream terraces along the Cape Fear River and the Upper Little River. Mapped areas are long and narrow and range from about 50 to 60 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam 4 inches thick. The subsurface layer is

grayish brown and brown fine sandy loam 8 inches thick. The subsoil to a depth of 50 inches is sandy clay loam. The upper part is yellowish brown and has light brownish gray mottles. The lower part is gray and has yellowish brown mottles. The underlying material to a depth of 60 inches is light gray loamy sand.

Permeability is moderate. Available water capacity is high. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 1 foot to 2 feet from December through May or during periods of heavy rainfall. This soil is subject to rare flooding for brief periods.

Included in mapping are small intermingled areas of the somewhat poorly drained Wahee soils and areas of the poorly drained Roanoke and Wehadkee soils in depressions and drainageways. Also included are the moderately well drained Altavista soils at the slightly higher elevations. Included soils make up about 10 to 20 percent of the map unit.

Most of this map unit is native forest consisting of species that can tolerate long periods of wetness. A few areas have been drained and are used as cropland.

This map unit is moderately suited to cultivated crops if surface and subsurface water are removed during the growing season. Corn, soybeans, and small grain are the main crops. A drainage system that includes open ditches, tile, and land grading improves surface drainage. If such a system is installed, this soil can produce high yields.

This map unit is moderately suited to hay and pasture. The wetness is a limitation. Plants that can tolerate wetness should be selected. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The major canopy trees are sweetgum, loblolly pine, and pin oak. The important understory species are switchcane and greenbrier. The wetness is a moderate limitation affecting the use of equipment. Wooded areas are important as habitat for raccoon, deer, fox, rabbit, opossum, birds, and other wildlife.

This map unit is poorly suited to urban uses. It generally is not used for residential or recreational development because of the wetness and the flooding.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

AyA—Aycock silt loam, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, well drained Aycock and similar soils in broad interstream areas in the uplands. Mapped areas are irregular in shape and range from about 4 to 75 acres in size.

Typically, the surface layer is grayish brown silt loam 7 inches thick. The subsurface layer is very pale brown silt loam 3 inches thick. The subsoil to a depth of 64 inches is silty clay loam. It is yellowish brown in the upper part; mottled strong brown and yellowish brown in the next part; and mottled brownish yellow, red, and light gray in the lower part. In some places the surface layer is loamy very fine sand or fine sandy loam. In other places the subsoil is redder.

Permeability is moderate or moderately slow. Available water capacity is high. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 4 to 6 feet from January through April during most years.

Included in mapping are small areas of Exum, Marlboro, and Norfolk soils. The moderately well drained Exum soils generally are in areas adjacent to depressions. Marlboro soils have more clay in the subsoil than the Aycock soil, and Norfolk soils contain more sand. Both of these soils are adjacent to sandy soils on the Coastal Plain. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. The remaining acreage is mainly woodland or pasture.

This map unit is well suited to cultivated crops, such as corn, soybeans, tobacco, cotton, and small grain. Winter cover crops, conservation tillage, and crop residue management help to maintain soil tilth. No-till planting, field borders, and a crop rotation that includes close-growing crops conserve soil and water.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant native trees are loblolly pine, red maple, hickory, yellow-poplar, American elm, black cherry, American beech, southern red oak, water oak, and white oak. The understory species are mainly dogwood, sassafras, sourwood, and waxmyrtle. No major limitations affect woodland use and management.

This map unit is moderately suited to most urban uses. The restricted permeability is a limitation on sites for septic tank absorption fields. It can be overcome by modifying the field or increasing the size of the absorption area. Low strength is a limitation affecting the design and construction of local roads and streets.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

AyB—Aycock silt loam, 2 to 6 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Aycock and similar soils on the slightly rounded parts of the uplands. Mapped areas are irregular in shape and range from about 4 to 100 acres in size.

Typically, the surface layer is grayish brown silt loam 7 inches thick. The subsurface layer is very pale brown silt loam 3 inches thick. The subsoil to a depth of 64 inches is silty clay loam. It is yellowish brown in the upper part; mottled strong brown and yellowish brown in the next part; and mottled brownish yellow, red, and light gray in the lower part. In some places the surface layer is loamy very fine sand or fine sandy loam. In other places the subsoil is redder.

Permeability is moderate or moderately slow. Available water capacity is high. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 4 to 6 feet from January through April during most years.

Included in mapping are a few small areas of Marlboro and Norfolk soils. The moderately well drained Exum soils generally are in areas adjacent to depressions. Marlboro soils have more clay in the subsoil than the Aycock soil, and Norfolk soils contain more sand. Both of these soils are adjacent to sandy soils on the Coastal Plain. They make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. The remaining acreage is mainly woodland and pasture.

This soil is well suited to cultivated crops, such as corn, soybeans, small grain, and cotton. Winter cover crops, conservation tillage, and crop residue management can help to control erosion and maintain tilth. Field borders and a crop rotation that includes close-growing crops conserve soil and water.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant trees are loblolly pine, southern red oak, white oak, and hickory. The main understory species include dogwood, holly, sourwood, and sassafras. No major limitations affect woodland use and management.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability is a limitation on sites for septic tank absorption fields. It can be overcome by modifying the field or absorption area.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Bb—Bibb loam, frequently flooded. This map unit consists mainly of nearly level, very deep, poorly drained Bibb and similar soils on flood plains and in small natural drainageways. Mapped areas are elongated bands that follow the stream channel. They range from less than 10 acres to more than 200 acres in size. Small areas, usually less than 10 acres in size, are common along upland drainageways.

Typically, the surface layer is dark grayish brown loam 10 inches thick. The underlying material extends to a depth of 60 inches. The upper part is dark gray and gray sandy loam, and the lower part is light gray loamy sand that has pockets of sandy loam. In places the soil has subsurface layers of loam or clay loam.

Permeability is moderate. Available water capacity is high. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet from December through May during most years or after prolonged periods of rain. This soil is frequently flooded for brief periods from December through May during most years.

Included in mapping are small areas of very poorly drained soils and soils that contain more clay than the Bibb soil. These soils are in depressions in large mapped areas along the major streams. They make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A few areas have been cleared of trees and are used for pasture or row crops.

This map unit is poorly suited to cultivated crops, such as corn and soybeans. The wetness and the flooding are the main management concerns. Generally, suitable outlets are not available for a drainage system because the unit is on the lowest part of the landscape.

This map unit is poorly suited to hay and pasture because of the wetness and the flooding. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant native trees are baldcypress, pond pine, red maple, green ash, hickory, sweetgum, swamp tupelo, river birch, water oak, willow oak, and swamp white oak. The understory species are mainly cedar, American holly, sweetbay, sourwood, reeds, and waxmyrtle. The wetness and the flooding result in a high seedling mortality rate and limit the use of equipment.

This soil is poorly suited to urban and recreational uses. The wetness and the flooding are the main management concerns.

The capability subclass is Vw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

BnB—Blaney loamy sand, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Blaney and similar soils on side slopes and narrow ridges in the uplands. Mapped areas are in long, narrow bands above and parallel to most of the streams in the sandhills. They range from about 10 to more than 100 acres in size.

Typically, the surface layer is grayish brown loamy sand 9 inches thick. The subsurface layer is light yellowish brown loamy sand 13 inches thick. The subsoil extends to a depth of 46 inches. The upper part is very pale yellow and light yellowish brown sandy clay loam. The lower part is brownish yellow sandy clay loam that has reddish yellow and light gray mottles. The underlying material to a depth of 64 inches is reddish yellow sandy clay loam that has light gray and very pale brown mottles and pockets of sandy loam and sandy clay.

Permeability is moderately slow. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched water table may be above the brittle subsoil for brief periods after heavy rains.

Included in mapping are small areas of Gilead, Vaucluse, and Candor soils. Gilead soils contain more clay than the Blaney soil, and Vaucluse soils have a thinner sandy surface layer. These soils are adjacent to side slopes and are on short, steep slopes. Candor soils contain less clay than the Blaney soil and are adjacent to sandy areas. They are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. The remaining acreage is used mainly for row crops or pasture.

This map unit is moderately suited to cultivated crops, such as corn, soybeans, tobacco, and small grain. Droughtiness and low fertility are the main limitations. Winter cover crops, conservation tillage, and crop residue management help to conserve moisture and maintain tilth. No-till planting, windbreaks, and a crop rotation that includes close-growing crops also conserve soil and water. Erosion is a moderate hazard where surface runoff concentrates in cultivated fields.

This map unit is well suited to hay and pasture plants, especially coastal bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant native trees are loblolly pine and longleaf pine. The understory species include sassafras and blackjack oak. The brittle subsoil may retard, but does not restrict, penetration by tree roots. The sandy surface texture results in a moderate seedling mortality rate and limits the use of equipment.

This map unit is moderately suited to most urban and recreational uses. Streams that flow through the unit are commonly dammed to make lakes for recreational purposes. Housing developments commonly surround these lakes. The moderately slow permeability is a limitation on sites for septic tank absorption fields. The sandy surface layer is a limitation affecting some recreational uses.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

BnD—Blaney loamy sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Blaney and similar soils on side slopes in the uplands. Mapped areas are in long, narrow bands above and parallel to most of the streams in the sandhills. They range from about 10 to more than 100 acres in size.

Typically, the surface layer is grayish brown loamy sand 9 inches thick. The subsurface layer is light yellowish brown loamy sand 13 inches thick. The subsoil extends to a depth of 46 inches. The upper part is very pale yellow and light yellowish brown sandy clay loam, and the lower part is brownish yellow sandy clay loam that has reddish yellow and light gray mottles. The underlying material to a depth of 64 inches is reddish yellow sandy clay loam that has light gray and very pale brown mottles and pockets of sandy loam and sandy clay. In places the soil is sandy within a depth of 60 inches.

Permeability is moderately slow. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched water table may be above the brittle subsoil for brief periods after heavy rains.

Included in mapping are small areas of Gilead, Vaucluse, and Candor soils. Gilead soils contain more clay than the Blaney soil, and Vaucluse soils have a thinner sandy surface layer. These soils are adjacent to side slopes and are on short, steep slopes. Candor soils contain less clay than the Blaney soil and are adjacent to sandy areas. They are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most areas of this map unit are woodland. A small acreage is used for cultivated crops or pasture.

This map unit is poorly suited to cultivated crops

because of the hazard of erosion caused by the slope. Contour farming, stripcropping, conservation tillage, crop residue management, and a crop rotation that includes 1 or more years of grasses or legumes help to control erosion.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant native trees are loblolly pine and longleaf pine. The understory species include sassafras and blackjack oak. The brittle subsoil may retard, but does not restrict, penetration by tree roots. The sandy surface texture and the slope result in a moderate seedling mortality rate and limit the use of equipment. Care should be taken to control erosion during planting and harvesting in disturbed areas.

This map unit is poorly suited to most urban uses and moderately suited to recreational uses. Streams that flow through the unit are commonly dammed to make lakes for recreational purposes. Housing developments commonly surround these lakes. The slope and the restricted permeability in the subsoil are limitations on sites for septic tank absorption fields. The slope is a limitation on sites for dwellings. The sandy surface layer and the slope limit some recreational uses.

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7S.

CaB—Candor sand, 0 to 8 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, somewhat excessively drained Candor and similar soils in broad upland areas, and, to a lesser extent, on rounded side slopes in the uplands. Mapped areas are irregular in shape and range from about 5 to more than 100 acres in size.

Typically, the surface layer is dark grayish brown sand 3 inches thick. The subsurface layer is yellowish brown sand about 22 inches thick. The upper subsoil to a depth of 35 inches is yellowish brown loamy sand. An intermediate layer of yellow sand is between depths of 35 and 60 inches. The lower subsoil to a depth of 85 inches is reddish yellow sandy clay loam.

Permeability is rapid in the upper part and moderate in the lower part. Available water capacity is very low. Reaction ranges from extremely acid to strongly acid in the subsoil, except where the surface layer has been limed.

Included in mapping are small areas of Blaney, Fuquay, and Wagram soils. These soils contain less sand than the Candor soil and are in areas adjacent to side slopes and at the lowest elevations. Also included are small areas of Wakulla and Lakeland soils. These soils contain more sand than the Candor soil and are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. The remaining acreage is mainly woodland.

This map unit is poorly suited to cultivated crops, such as corn, soybeans, small grain, and truck crops. The main limitation is the very low available water capacity. Soil blowing also is a limitation. Conservation tillage, crop residue management, windbreaks, and a cropping sequence that includes close-growing grasses and legumes help to control soil blowing and conserve moisture.

This map unit is moderately suited to hay and pasture. Coastal bermudagrass and bahiagrass are the preferred grasses. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant trees are loblolly pine and longleaf pine. The main understory species are blackjack oak and turkey oak. The thick, sandy surface layer may limit the use of equipment.

This map unit is moderately suited to most urban and recreational uses. Lawns and shrubs may be difficult to establish and to maintain because of leaching of plant nutrients and droughtiness. Seepage and the instability of ditchbanks and trench walls are limitations (fig. 2).

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 4S.

CaD—Candor sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, somewhat excessively drained Candor and similar soils on side slopes in the uplands. Mapped areas are long and narrow and range from about 5 to 50 acres in size.

Typically, the surface layer is dark grayish brown sand 3 inches thick. The subsurface layer is yellowish brown sand about 22 inches thick. The upper subsoil to a depth of 35 inches is yellowish brown loamy sand. An intermediate layer of yellow sand is between depths of 35 and 60 inches. The lower subsoil to a depth of 85 inches is reddish yellow sandy clay loam.

Permeability is rapid in the upper part and moderate in the lower part. Available water capacity is very low. Reaction ranges from extremely acid to strongly acid in the subsoil, except where the surface layer has been limed.

Included in mapping are small areas of Blaney, Fuquay, and Wagram soils. These soils contain less

Figure 2.—An area of Candor sand, 0 to 8 percent slopes. Instability of ditches and roadcuts is a management concern.

sand than the Candor soil and are in areas adjacent to side slopes or at the lowest elevations. Also included are small areas of Wakulla and Lakeland soils. These soils contain more sand than the Candor soil and are at the higher elevations. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A few areas are used for cultivated crops. The remaining acreage is mainly pasture.

This map unit is poorly suited to cultivated crops. The main limitations are the slope and the very low available water capacity. Conservation tillage, crop residue management, a cropping system that includes close-growing grasses and legumes, contour farming, and stripcropping help to control soil loss and conserve moisture.

This map unit is moderately suited to hay and pasture. It is best suited to forage plants, such as coastal bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant trees are longleaf pine and loblolly pine. The

main understory species are blackjack oak and turkey oak. The slope and the thick, sandy surface layer may limit the use of equipment.

This map unit is moderately suited to most urban and recreational uses. The slope and the thick, sandy surface layer are the main limitations. Lawns and shrubs may be difficult to establish and to maintain because of leaching of plant nutrients and droughtiness. Seepage and the instability of ditchbanks and trench walls also are limitations.

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 4S.

CeB—Cecil fine sandy loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Cecil and similar soils on convex ridgetops in the uplands. It is along the Upper Little River and the Cape Fear River west of Lillington. Mapped areas are irregular in shape and range from about 10 to 75 acres in size.

Typically, the surface layer is brown fine sandy loam 2 inches thick. The subsurface layer is reddish yellow fine sandy loam 2 inches thick. The upper part of the subsoil to a depth of 36 inches is red clay loam or clay. The lower part to a depth of 55 inches is red loam. The underlying material is multicolored red, yellow, and gray loam that has soft, micaceous schist saprolite. In some areas the surface layer is gravelly. In other areas granite stones as much as 3 feet in diameter are on the surface. In some eroded areas the surface layer is sandy clay loam or clay loam. In areas adjacent to the Coastal Plain, the surface layer commonly is loamy sand. In places the subsoil is yellow.

Permeability is moderate. Available water capacity also is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The depth to bedrock is more than 60 inches.

Included in mapping are small areas of Pacolet, Nason, Louisa, and Norfolk soils. Pacolet soils have a thinner subsoil than that of the Cecil soil, and Nason soils have soft bedrock within a depth of 60 inches. These soils are in the steeper areas. Louisa soils have a thinner subsoil than that of the Cecil soil and are on very narrow, short, steep slopes adjacent to flood plains. Norfolk soils contain less clay than the Cecil soil and are in adjacent Coastal Plain areas. Included soils make up about 20 to 35 percent of the map unit.

Most of this map unit is native woodland. A few areas are used for crops or pasture.

This map unit is well suited to the cultivated crops commonly grown in the area. The major crops are corn, soybeans, and tobacco. Surface runoff and erosion are the main management concerns. Terraces, grassed waterways, field borders, crop residue management, and conservation tillage can help to control erosion and runoff.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, Virginia pine, a variety of oaks, yellow-poplar, sweetgum, and hickory are the major canopy trees. The understory trees include dogwood, American holly, red cedar, black cherry, and red maple. No significant limitations affect timber production.

This map unit is well suited to most urban and recreational uses. The clayey subsoil and low strength are limitations. Silt fences and sedimentation basins can be used to control erosion on construction sites.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

CeD—Cecil fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Cecil and similar soils on side slopes in the uplands. It is along the Upper Little River west of Lillington. Mapped areas are long and narrow and range from about 10 to 100 acres in size.

Typically, the surface layer is brown fine sandy loam 2 inches thick. The subsurface layer is reddish yellow fine sandy loam 2 inches thick. The upper part of the subsoil to a depth of 36 inches is red clay loam or clay. The lower part to a depth of 55 inches is red loam. The underlying material is multicolored red, yellow, and gray loam that has soft, micaceous schist saprolite. In some areas the surface layer is gravelly. In other areas granite stones as much as 3 feet in diameter are on the surface. In some eroded areas the surface layer is sandy clay loam or clay loam. In areas adjacent to the Coastal Plain, the surface layer commonly is loamy sand. In places the subsoil is yellow.

Permeability is moderate. Available water capacity also is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The depth to bedrock is more than 60 inches.

Included in mapping are small areas of Pacolet, Nason, Louisa, and Norfolk soils. Pacolet soils have a thinner subsoil than that of the Cecil soil, and Nason soils have soft bedrock within a depth of 60 inches. These soils are in the steeper areas. Louisa soils have a thinner subsoil than that of the Cecil soil and are on very narrow, short, steep slopes adjacent to flood plains. Norfolk soils contain less clay than the Cecil soil and are in adjacent Coastal Plain areas. Included soils

make up about 20 to 35 percent of the map unit.

Most of this map unit is native woodland. A few areas are used for crops or pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. The slope, surface runoff, and erosion are the main management concerns. Terraces, grassed waterways, field borders, crop residue management, and conservation tillage can help to control erosion and runoff.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The slope may limit the use of equipment in steeper areas.

This map unit is well suited to woodland. Loblolly pine, Virginia pine, a variety of oaks, yellow-poplar, sweetgum, and hickory are the major canopy trees. The understory trees include dogwood, American holly, red cedar, black cherry, and red maple. No significant limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The slope, the clayey subsoil, and low strength are limitations. Silt fences and sedimentation basins can be used to control erosion on construction sites.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Ch—Chewacla and Congaree loams, frequently flooded. This map unit consists mainly of nearly level, very deep Chewacla, Congaree, and similar soils on flood plains along the Upper Little River and the Cape Fear River and their tributaries. The Chewacla and similar soils are somewhat poorly drained and are along the base of the uplands, and the Congaree and similar soils are well drained and are adjacent to the stream channels. Mapped areas are long and narrow and range from about 10 to 60 acres in size.

The Chewacla soil makes up about 50 percent of this map unit. Typically, the surface layer is yellowish brown loam 7 inches thick. The upper part of the subsoil from a depth of 7 to 13 inches is dark yellowish brown loam that has very pale brown mottles. The next part from a depth of 13 to 24 inches is mottled yellowish brown, light gray, dark grayish brown, and brownish yellow loam. The lower part from a depth of 24 to 38 inches is light gray clay loam that has brownish yellow and pale brown mottles. The underlying material to a depth of 60 inches is light gray and light brownish gray, stratified loam and clay loam having yellow, brown, and gray mottles.

Permeability is moderate in the Chewacla soil. Available water capacity also is moderate. Reaction is very strongly acid to slightly acid. From November through April during most years, the seasonal high water table is at a depth of about 0.5 foot to 1.5 feet and the soil is frequently flooded for brief to long periods.

The Congaree soil makes up about 30 percent of this map unit. Typically, the surface layer is brown loam 18 inches thick. The upper part of the underlying material to a depth of 38 inches is dark brown loam that has yellowish brown mottles. The lower part to a depth of 60 inches is dark yellowish brown silt loam that has light gray, pale brown, and black mottles.

Permeability is moderate in the Congaree soil. Available water capacity is high. Reaction is strongly acid to neutral. From November through April during most years, the seasonal high water table is at a depth of about 2 to 4 feet and the soil is frequently flooded for brief to long periods.

Included in mapping are small areas of Wehadkee, Roanoke, and Altavista soils. Wehadkee and Roanoke soils are poorly drained. They are in slight depressions adjacent to uplands or high terraces and in drainageways. Altavista soils have a more developed subsoil than that of the Chewacla and Congaree soils and are adjacent to uplands or other soils on terraces. Included soils make up about 20 percent of the map unit.

Most of this map unit is native woodland. Some areas are used for crops and pasture.

This map unit is moderately suited to cultivated crops but is seldom cultivated because of the wetness, poor accessibility, and the flooding. Also, most areas are too narrow to efficiently cultivate. Corn, soybeans, and small grain are grown in some areas.

This map unit is moderately suited to hay and pasture. Plants that can tolerate the wetness and the flooding should be selected. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland and is very productive. Oaks, loblolly pine, Virginia pine, sycamore, yellow-poplar, and river birch are the major canopy species. The understory species include red maple, American holly, black cherry, and a variety of vines and shrubs. No significant limitations affect timber production in areas of the Congaree soil. The wetness causes a moderate equipment limitation in areas of the Chewacla soil.

This map unit is poorly suited to most urban and recreational uses. The flooding, the wetness, and a slow runoff rate are the main limitations.

The Chewacla soil is in capability subclass IVw, and the Congaree soil is in capability subclass IIIw. Based

on yellow-poplar as the indicator species, the woodland ordination symbol for the Chewacla soil is 7W. Based on sweetgum as the indicator species, the woodland ordination symbol for the Congaree soil is 10A.

Co—Coxville loam. This map unit consists mainly of nearly level, very deep, poorly drained Coxville and similar soils on flats, in slight depressions, and near the head of drainageways. It is mainly in the eastern part of the county, north of the Cape Fear River. Mapped areas are irregular in shape or oval and range from about 5 to 100 acres in size.

Typically, the surface layer is black loam 6 inches thick. The upper part of the subsoil is gray sandy clay loam. The lower part to a depth of 60 inches is gray clay.

Permeability is moderately slow. Available water capacity is high. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at the surface or within a depth of 1.5 feet from November through April during most years or after periods of heavy rainfall.

Included in mapping are small areas of Rains, Grantham, Toisnot, and Lynchburg soils. These soils contain less clay than the Coxville soil and are along the edge of mapped areas. They are adjacent to well drained soils. They make up about 10 to 20 percent of the map unit.

Most of this map unit is native forest. A few areas have been cleared of trees and are used as cropland or pasture.

This map unit is poorly suited to cultivated crops unless the soil is drained. Some areas, however, have been intensively drained and are used as cropland. Corn, soybeans, and small grain are the main crops. A drainage system that includes open ditches and land grading improves surface drainage. If such a system is installed, this soil can produce high yields.

This map unit is moderately suited to hay and pasture. Areas that have adequate surface drainage produce good stands of pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. Species that can tolerate long periods of wetness are very productive. The major canopy trees are sweetgum, yellow-poplar, loblolly pine, and pin oak. The important understory species are switchcane and greenbrier. Wooded areas are important as habitat for raccoon, fox, rabbit, opossum, birds, and other wildlife.

This map unit is poorly suited to most urban and recreational uses because of the wetness and the moderately slow permeability.

The capability subclass is IIIw in drained areas and VIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

DoA—Dothan loamy sand, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, well drained Dothan and similar soils on broad divides on the upper Coastal Plain. It is in the western part of the county, north of the Upper Little River and west of Buies Creek. It is mostly at an elevation of more than 265 feet. Mapped areas are irregular in shape and range from about 10 to 150 acres in size.

Typically, the surface layer is brown loamy sand 10 inches thick. The subsurface layer is pale yellow loamy sand 2 inches thick. The subsoil to a depth of 80 inches is sandy clay loam. The upper part is yellowish brown. The next part is brownish yellow. The lower part is mottled yellowish brown, very pale brown, and red and contains about 15 percent plinthite. Some areas have a gravelly surface layer.

Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. The plinthite in the lower part of the subsoil inhibits the movement of air and water. Available water capacity is moderate. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 3 to 5 feet from January through April during most years or after periods of heavy rainfall.

Included in mapping are small areas of Fuquay, Norfolk, Orangeburg, and Wagram soils. Fuquay and Wagram soils have more sand in the surface layer than the Dothan soil and are adjacent to sandy areas. Orangeburg and Norfolk soils do not have plinthite in the subsoil. Orangeburg soils are along the edge of mapped areas. Norfolk soils are intermingled with areas of the Dothan soil. They are at the lower elevations. Included soils make up about 25 to 35 percent of the map unit.

Most of this map unit is used as cropland. A few small areas are used as pasture or woodland.

This map unit is well suited to the cultivated crops commonly grown in the area. Corn, soybeans, tobacco, small grain, and sweet potatoes are the main crops. Conservation tillage and crop residue management help to maintain high productivity (fig. 3).

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Productivity is very high. Loblolly pine, longleaf pine, sweetgum, a variety of oaks, and hickory are the major canopy trees.

Figure 3.—No-till soybeans in an area of Dothan loamy sand, 0 to 2 percent slopes. No-till planting conserves soil moisture during dry periods.

The understory species include dogwood, American holly, and black cherry. No significant limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability and the perched water table in the lower part of the subsoil are the main limitations. Good design and careful installation can help to overcome these limitations.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

DoB—Dothan loamy sand, 2 to 6 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Dothan and similar soils on broad divides on the upper Coastal Plain. It is in the western part of the county, north of the Upper Little River and west of Buies Creek. It is mostly at an elevation of more than 265 feet. Mapped areas are irregular in shape and

range from about 5 to 50 acres in size.

Typically, the surface layer is brown loamy sand 10 inches thick. The subsurface layer is pale yellow loamy sand 2 inches thick. The subsoil to a depth of 80 inches is sandy clay loam. The upper part is yellowish brown. The next part is brownish yellow. The lower part is mottled yellowish brown, very pale brown, and red and contains about 15 percent plinthite. Some areas have a gravelly surface layer.

Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. The plinthite in the lower part of the subsoil inhibits the movement of air and water. Available water capacity is moderate. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 3 to 5 feet from January through April during most years or after periods of heavy rainfall.

Included in mapping are small areas of Fuquay, Norfolk, Orangeburg, Cecil, and Wagram soils. Orangeburg and Cecil soils do not have plinthite in the subsoil and are along the edge of mapped areas. Fuquay and Wagram soils have more sand in the surface layer than the Dothan soil and are adjacent to sandy areas. Norfolk soils do not have plinthite in the subsoil and are intermingled with areas of the Dothan soil at the lower elevations. Included soils make up about 25 to 35 percent of the map unit.

Most of this map unit is used as cropland. A few small areas are used as pasture or woodland.

This map unit is well suited to the cultivated crops commonly grown in the area. Corn, soybeans, tobacco, small grain, and sweet potatoes are the main crops. Surface runoff and erosion are moderate management concerns if the soil is cultivated. Terraces, field borders, grassed waterways, conservation tillage, and crop residue management can help to control runoff and erosion (fig. 4).

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Productivity is very high. Loblolly pine, longleaf pine, sweetgum, a variety of oaks, and hickory are the major canopy trees. The understory species include dogwood, American holly, and black cherry. No significant limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability and the perched water table in the lower part of the subsoil are the main limitations. Good design and careful installation can help to overcome these limitations.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

DtB—Dothan gravelly loamy sand, 0 to 6 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, well drained Dothan and similar soils on broad divides on the upper Coastal Plain. It is in the western part of the county, north of the Upper Little River and west of Buies Creek. It is mostly at an elevation of more than 265 feet. Mapped areas are irregular in shape and range from about 10 to 100 acres in size.

Typically, the surface layer is dark grayish brown gravelly loamy sand 9 inches thick. The subsurface layer is brownish yellow gravelly sandy loam 4 inches thick. The subsoil from a depth of 13 to 60 inches is sandy clay loam. The upper part is strong brown. The next part is brownish yellow and has red mottles. The lower part is mottled red, strong brown, and light gray. In some areas the surface layer is not gravelly. In other areas the upper part of the subsoil has more than 5 percent plinthite.

Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. Plinthite in the lower part of the subsoil inhibits the movement of air and water. Available water capacity is moderate. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 3 to 5 feet from January through April during most years or after periods of heavy rainfall.

Included in mapping are small areas of Fuquay, Norfolk, Orangeburg, Lillington, and Vaucluse soils. Fuquay soils have more sand in the surface layer than the Dothan soil and are adjacent to sandy areas. Norfolk soils do not have plinthite in the subsoil and are intermingled with areas of the Dothan soil at the lower elevations. Orangeburg, Lillington, and Vaucluse soils do not have plinthite in the subsoil and are along the edge of mapped areas. Included soils make up about 25 to 30 percent of the map unit.

Most of this map unit is used as cropland. A few small areas are used as pasture or woodland.

This map unit is well suited to the cultivated crops commonly grown in the area. Corn, soybeans, tobacco, small grain, and sweet potatoes are the main crops. Surface runoff and erosion are moderate management concerns if this soil is cultivated. The gravel in the surface layer is a limitation affecting some tillage implements. Terraces, field borders, grassed waterways, conservation tillage, and crop residue management can help to control runoff and erosion.

Figure 4.—A grassed waterway in an area of Dothan loamy sand, 2 to 6 percent slopes. It provides a safe outlet for surface runoff from surrounding cropland.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Productivity is very high. Loblolly pine, longleaf pine, sweetgum, a variety of oaks, and hickory are the major canopy trees. The understory species include dogwood, American holly, and black cherry. No significant limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability and the perched water table in the lower part of the subsoil are the main limitations. Good design and careful installation can help to overcome these limitations.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

DyF—Dystrochrepts, steep. This map unit consists mainly of steep, moderately deep, well drained Dystrochrepts and similar soils on bluffs above the Cape Fear River and its major tributaries. Mapped areas are long and narrow and range from 25 to more than 200 acres in size.

Typically, Dystrochrepts have a surface layer of dark grayish brown loam 2 inches thick. The subsoil is sandy loam about 38 inches thick. It is brownish yellow in the upper part and strong brown in the lower part. The upper part of the underlying material is strong brown gravelly sand. The lower part to a depth of 72 inches is brownish yellow sandy clay.

Permeability is moderately rapid. Available water capacity is low. Reaction is very strongly acid or strongly acid.

Most of this map unit is used as woodland. A few small areas have been cleared of trees and are

used as sites for pipelines or power lines.

Dystrochrepts are poorly suited to all agricultural and urban uses. The slope severely restricts the use of equipment.

Common trees in this map unit include American beech, yellow-poplar, American sycamore, loblolly pine, sweetgum, and southern red oak. Common understory species include holly, American hornbeam, eastern hophornbeam, pawpaw, and serviceberry. Although trees grow well on this soil, harvesting timber is difficult because of the slope. The use of heavy equipment may result in severe surface erosion and soil slippage. Because the slopes are highly erodible and unstable, most areas of this map unit probably will remain undisturbed and used as scenic woodland and for watershed protection.

The capability subclass is VIIe. The soils in this map unit have not been assigned a woodland ordination symbol.

EnB—Enon fine sandy loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Enon and similar soils on broad, smooth interstream divides. It is mostly in the northwestern part of the county. Mapped areas are irregular in shape and range from about 3 to 100 acres in size.

Typically, the surface layer is dark brown fine sandy loam 5 inches thick. The upper part of the subsoil is yellowish brown clay. The next part is yellowish brown clay loam that has yellowish red and gray mottles. The lower part to a depth of 32 inches is yellowish brown loam that has gray mottles. The underlying material to a depth of 60 inches is mottled loam saprolite.

Permeability is slow. Available water capacity is moderate. The surface layer is strongly acid to slightly acid, except where limed. The subsoil ranges from strongly acid to mildly alkaline. The shrink-swell potential is high.

Included in mapping are small areas of similar soils that have a surface layer of clay loam. Also included are small areas of Cecil and Helena soils. Cecil soils have a less plastic subsoil than that of the Enon soil, and Helena soils are moderately well drained. The included soils are intermingled with areas of the Enon soil on the landscape. They make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. A small acreage is used as woodland.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, tobacco, and truck crops. The hazard of erosion is the main management concern. Crop residue management, conservation tillage, and cover crops help to control erosion.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, sweetgum, yellow-poplar, and a variety of oaks are the dominant trees. The understory species include dogwood, sourwood, holly, red maple, greenbrier, and poison ivy. No major limitations affect timber production.

This map unit is poorly suited to most urban and recreational uses. The restricted permeability and the high shrink-swell potential are the main limitations.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

EnD—Enon fine sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Enon and similar soils on long, narrow side slopes in the uplands. Mapped areas are irregular in shape and range from about 3 to more than 15 acres in size.

Typically, the surface layer is dark brown fine sandy loam 5 inches thick. The upper part of the subsoil is yellowish brown clay. The next part is yellowish brown clay loam that has yellowish red and gray mottles. The lower part to a depth of 32 inches is yellowish brown loam that has gray mottles. The underlying material to a depth of 60 inches is mottled loam saprolite.

Permeability is slow. Available water capacity is moderate. The surface layer is strongly acid to slightly acid, except where limed. The subsoil ranges from strongly acid to mildly alkaline. The shrink-swell potential is high.

Included in mapping are small areas of similar soils that have a surface layer of clay loam. Also included are small areas of Cecil, Pacolet, and Helena soils. Cecil and Pacolet soils have a less plastic subsoil than that of the Enon soil, and Helena soils are moderately well drained. These included soils are intermingled with areas of the Enon soil on the landscape. They make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A small acreage is used as pasture or cropland.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, tobacco, and truck crops. The slope and erosion are the main management concerns. Crop residue management, conservation tillage, and cover crops help to control erosion.

This map unit is well suited to hay and pasture.

Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, sweetgum, yellow-poplar, and a variety of oaks are the dominant canopy trees. The understory species include dogwood, holly, sourwood, red maple, greenbrier, and poison ivy. No major limitations affect timber production.

This map unit is poorly suited to most urban and recreational uses. The restricted permeability and the high shrink-swell potential are the main limitations.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

ExA—Exum very fine sandy loam, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, moderately well drained Exum and similar soils on broad flats in the uplands. Most areas of this map unit are between Lillington and the Cumberland County line. Mapped areas are irregular in shape and range from about 5 to 50 acres in size.

Typically, the surface layer is brown very fine sandy loam 8 inches thick. The subsoil from a depth of 8 to 80 inches is clay loam. It is yellowish brown in the upper part. The next part is yellowish brown and has gray mottles. The lower part is mottled red, gray, and strong brown.

Permeability is moderately slow. Available water capacity is high. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 2 to 3 feet from December through April during most years.

Included in mapping are small areas of Norfolk, Aycock, Goldsboro, Nahunta, Lynchburg, and Grantham soils. Norfolk and Aycock soils are well drained. They are in the steeper areas or in areas adjacent to side slopes. Goldsboro soils contain less silt than the Exum soil. They are intermingled with areas of the Exum soil. Nahunta and Lynchburg soils are somewhat poorly drained. They are in broad flat areas. Grantham soils are poorly drained. They are in depressions or along the outer edge of mapped areas. Also included are small areas of soils that have layers of sand or sandy loam within a depth of 60 inches. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. The remaining acreage is mainly woodland or pasture.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, tobacco, small grain, and cotton. A drainage system is needed in some areas for the optimum production of tobacco and other moisture-sensitive crops.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant canopy trees are loblolly pine, white oak, southern red oak, and red maple. The understory species include holly and sourwood. The wetness may limit the use of equipment. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The wetness and low strength are the main limitations. A drainage system is necessary in many areas to ensure the proper functioning of septic tank absorption fields.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

FaB—Fuquay loamy sand, 0 to 6 percent slopes. This map unit consists mainly of gently sloping to strongly sloping, very deep, well drained Fuquay and similar soils on broad ridges. It is in the western part of the county, north of the Upper Little River and west of Buies Creek. It is generally at an elevation of more than 265 feet. Mapped areas are irregular in shape and range from about 10 to 150 acres in size.

Typically, the surface layer is dark grayish brown loamy sand 10 inches thick. The subsurface layer is very pale brown loamy sand 18 inches thick. The subsoil extends to a depth of 72 inches. It is yellowish brown sandy loam in the upper part. The next part is brownish yellow sandy clay loam that has red mottles. The next part is mottled red, strong brown, and gray sandy clay loam containing about 20 percent plinthite. The lower part is brownish yellow sandy clay loam that has yellowish red and light gray mottles.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Available water capacity is low. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 4 to 6 feet from January through March during most years or after periods of heavy rainfall.

Included in mapping are small areas of Dothan, Candor, and Blaney soils. Dothan soils are less sandy than the Fuquay soil and are in the steeper, eroded areas. Candor soils contain more sand than the Fuquay soil and are at an elevation of more than 400 feet. Blaney soils have brittle layers in the subsoil and are on side slopes and toe slopes. Included soils make up about 15 percent of the map unit.

Most of this map unit is used for cultivated crops,

pasture, or hay. The remaining acreage is used as woodland.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, soybeans, tobacco, and small grain. Leaching of plant nutrients, soil blowing, and low available water capacity are the main limitations. Crop residue management, conservation tillage, and cover crops help to control soil blowing and reduce the leaching of nutrients.

This map unit is moderately suited to hay and pasture. It is best suited to warm-season grasses, such as bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The main canopy trees are loblolly pine and longleaf pine. The main understory species include sassafras, holly, dogwood, and oaks. The sandy texture of the surface layer may limit seedling establishment and the use of some equipment.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability in the lower part of the subsoil limits some urban uses. Lawns and shrubs may be difficult to maintain because of droughtiness.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

FuB—Fuquay gravelly loamy sand, 0 to 6 percent slopes. This map unit consists mainly of gently sloping to strongly sloping, very deep, well drained Fuquay and similar soils on broad ridges in the western part of the county, north of the Upper Little River and west of Buies Creek. It is generally at an elevation of more than 265 feet. Mapped areas are irregular in shape and range from about 10 to 100 acres in size.

Typically, the surface layer is dark grayish brown gravelly loamy sand 10 inches thick. The subsurface layer is very pale brown loamy sand 18 inches thick. The subsoil extends to a depth of 72 inches. It is yellowish brown sandy loam in the upper part. The next part is brownish yellow sandy clay loam that has red mottles. The next part is mottled red, strong brown, and gray sandy clay loam containing about 20 percent plinthite. The lower part is brownish yellow sandy clay loam that has yellowish red and light gray mottles.

Permeability is moderate in the upper part of the subsoil and slow in the lower part. Available water capacity is low. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 4 to 6 feet from January through March during most years or after periods of heavy rainfall.

Included in mapping are small areas of Dothan, Candor, and Blaney soils. Dothan soils are less sandy than the Fuquay soil and are in the steeper, eroded areas. Candor soils contain more sand than the Fuquay soil and are at an elevation of more than 400 feet. Blaney soils have brittle layers in the subsoil and are on side slopes and toe slopes. Included soils make up about 15 percent of the map unit.

Most of this map unit is used for cultivated crops, pasture, or hay. The remaining acreage is used as woodland.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, soybeans, tobacco, and small grain. Leaching of plant nutrients, soil blowing, and low available water capacity are the main limitations (fig. 5). The gravel in the surface layer can damage tillage implements. Crop residue management, conservation tillage, and cover crops help to control soil blowing and reduce the leaching of nutrients.

This map unit is moderately suited to hay and pasture. It is best suited to warm-season grasses, such as bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The main canopy trees are loblolly pine and longleaf pine. The main understory species include sassafras, holly, dogwood, and oaks. The sandy texture of the surface layer may limit seedling establishment and the use of equipment.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability in the lower part of the subsoil limits some urban uses. The gravelly surface layer limits some recreational uses. Lawns and shrubs may be difficult to maintain because of droughtiness.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

GaA—Gilead loamy sand, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, moderately well drained Gilead and similar soils on toe slopes above streams. It is mostly in the western part of the county. Mapped areas are elongated or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is pale brown loamy sand 5 inches thick. The subsoil is 52 inches thick. It is brownish yellow sandy clay loam in the upper part, reddish yellow and brownish yellow sandy clay in the next part, and brownish yellow sandy clay loam in the

Figure 5.—Low available water capacity increases the need to irrigate the tobacco in this area of Fuquay gravelly loamy sand, 0 to 6 percent slopes.

lower part. The upper part of the underlying material is mottled brownish yellow and light gray sandy clay loam, the next part is white clay, and the lower part to a depth of 80 inches is light gray gravelly sand.

Permeability is moderately slow or slow. Available water capacity is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched seasonal high water table is above the clayey subsoil. It is at a depth of about 1.5 to 2.5 feet from January through March during most years or after periods of heavy rainfall.

Included in mapping are small areas of Blaney, Fuquay, Dothan, and Vaucluse soils. These soils contain less clay in the subsoil than the Gilead soil. Also, Dothan soils have a thicker subsoil. The included soils are intermingled with areas of the Gilead soil. They make up about 20 percent of the map unit.

Most of this map unit is used as woodland. The

remaining acreage is used for cultivated crops, hay, and pasture.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, soybeans, tobacco, and small grain. The wetness is the main limitation. A drainage system is needed in some areas for optimum production of moisture-sensitive crops, such as tobacco.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The clayey subsoil may restrict root penetration during dry periods.

This map unit is well suited to woodland. The main canopy trees are loblolly pine and longleaf pine. The understory species include blackjack oak, dogwood, sourwood, holly, and threeawn. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The wetness and the restricted permeability in the clayey subsoil are the main limitations. In some of the steeper areas, water seeps along the base of the slopes during wet periods. The wetness can be a severe limitation on sites for dwellings, waste disposal systems, or recreational structures.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

GaB—Gilead loamy sand, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, moderately well drained Gilead and similar soils on side slopes along streams in the uplands. It is mostly in the western part of the county. Mapped areas are elongated or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is pale brown loamy sand 5 inches thick. The subsoil extends to a depth of 52 inches. It is brownish yellow sandy clay loam in the upper part, reddish yellow and brownish yellow sandy clay in the next part, and brownish yellow sandy clay loam in the lower part. The upper part of the underlying material is mottled brownish yellow and light gray sandy clay loam, the next part is white clay, and the lower part to a depth of 80 inches is light gray gravelly sand.

Permeability is moderately slow or slow. Available water capacity is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched seasonal high water table is above the clayey subsoil. It is at a depth of about 1.5 to 2.5 feet from January through March during most years or after periods of heavy rainfall.

Included in mapping are small areas of Blaney, Fuquay, Dothan, and Vaucluse soils. These soils contain less clay in the subsoil than the Gilead soil. Also, Dothan soils have a thicker subsoil. The included soils are intermingled with areas of the Gilead soil. They make up about 20 percent of the map unit.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, soybeans, tobacco, and small grain. The hazard of erosion is the main management concern. Winter cover crops, conservation tillage, and crop residue management help to control erosion and maintain tilth. Field borders, a cropping sequence that includes close-growing crops, contour farming, and strip-cropping conserve soil and water.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The clayey subsoil may restrict root penetration during dry periods.

This map unit is well suited to woodland. The main canopy trees are loblolly pine and longleaf pine. The understory species include blackjack oak, dogwood, sourwood, holly, and pineland threeawn. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The wetness and the restricted permeability in the clayey subsoil are the main limitations. In some of the steeper areas, water seeps along the base of the slopes during wet periods. The wetness can be a severe limitation on sites for dwellings, waste disposal systems, or recreational structures.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

GaD—Gilead loamy sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, moderately well drained Gilead and similar soils on side slopes along streams in the uplands. It is mostly in the western part of the county. Mapped areas are elongated or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is pale brown loamy sand 5 inches thick. The subsoil extends to a depth of 52 inches. It is brownish yellow sandy clay loam in the upper part, reddish yellow and brownish yellow sandy clay in the next part, and brownish yellow sandy clay loam in the lower part. The upper part of the underlying material is mottled brownish yellow and light gray sandy clay loam, the next part is white clay, and the lower part to a depth of 80 inches is light gray gravelly sand.

Permeability is moderately slow or slow. Available water capacity is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched seasonal high water table is above the clayey subsoil. It is at a depth of about 1.5 to 2.5 feet from January through March during most years or after periods of heavy rainfall.

Included in mapping are small areas of Blaney, Fuquay, Dothan, and Vaucluse soils. These soils contain less clay in the subsoil than the Gilead soil. Also, Dothan soils have a thicker subsoil. The included soils are intermingled with areas of the Gilead soil. Also included are some areas of soils that have a short, steep slope that was formed by the mass movement of soil downslope. These soils are usually somewhat poorly drained or poorly drained, gray clay. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A small acreage is used for pasture.

This map unit is poorly suited to cultivated crops. The hazard of erosion is the main management concern. Because of slope, controlling erosion on this soil is very difficult if cultivated crops are grown.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The slope limits the use of some equipment.

This map unit is well suited to woodland. The main canopy trees are loblolly pine and longleaf pine. The understory species include blackjack oak, dogwood, sourwood, holly, and pineland threeawn. No significant limitations affect woodland use and management if care is taken during planting and harvesting to limit soil disturbance and control erosion.

This map unit is moderately suited to most urban and recreational uses. The wetness, the slope, and the restricted permeability in the clayey subsoil are the major limitations. The combination of the slope, the wetness, and the slow permeability results in hillside seepage in some areas during wet periods. In these areas the wetness can be a limitation on sites for buildings, dwellings, waste disposal systems, or recreational structures.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

GoA—Goldsboro loamy sand, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, moderately well drained Goldsboro and similar soils on broad, smooth flats in the uplands. It is most extensive in the eastern part of the county. Mapped areas are irregular in shape and range from about 5 to 75 acres in size.

Typically, the surface layer is dark grayish brown loamy sand 8 inches thick. The subsurface layer is light yellowish brown loamy sand 4 inches thick. The subsoil is sandy clay loam to a depth of 75 inches. The upper part of the subsoil is brownish yellow. The next part is light yellowish brown and has yellowish brown and light gray mottles. The lower part is mottled yellowish brown, yellowish red, and light gray.

Permeability is moderate. Available water capacity also is moderate. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 2 to 3 feet from December through April during most years.

Included in mapping are small areas of Norfolk, Aycock, Exum, Lynchburg, Nahunta, and Rains soils. Norfolk and Aycock soils are well drained. They are at the higher elevations. Exum soils contain more silt than the Goldsboro soil. They are intermingled with areas of the Goldsboro soil. Lynchburg and Nahunta soils are somewhat poorly drained. They are at the lower elevations and in depressions. Rains soils are poorly drained. They are in depressions or along the outer edge of mapped areas. Included soils make up about 15 percent of the map unit.

Most of this map unit is used for cultivated crops. A small acreage is used as woodland.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, small grain, and tobacco. A drainage system is needed in some areas for the optimum production of tobacco and other moisture-sensitive crops.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant canopy trees are loblolly pine, white oak, and southern red oak. The understory species include dogwood, red maple, holly, and sourwood. The use of equipment may be limited if trees are harvested or planted during wet periods.

This map unit is moderately suited to most urban and recreational uses. The wetness is the main limitation.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

Gr—Grantham loam. This map unit consists mainly of nearly level, very deep, poorly drained Grantham and similar soils on broad, smooth flats in the uplands. It is most extensive between Lillington and the Cumberland

County line. Mapped areas are irregular in shape and range from about 5 to 200 acres in size.

Typically, the surface layer is very dark gray loam 5 inches thick. The subsoil extends to a depth of 80 inches. The upper part is light brownish gray clay loam that has brownish yellow mottles. The next part is gray silty clay that has brownish yellow and red mottles. The lower part is light gray clay loam that has yellowish brown and red mottles.

Permeability is moderately slow. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at the surface or within a depth of 1 foot from December through May during most years.

Included in mapping are small areas of Coxville, Lynchburg, Nahunta, and Rains soils. Coxville and Rains soils contain more clay than the Grantham soil. They are intermingled with areas of the Grantham soil. Lynchburg and Nahunta soils are somewhat poorly drained. They are on the higher parts of the landscape. Included soils make up about 15 percent of the map unit.

Most of this map unit is used as woodland. The remaining acreage is used for crops or pasture.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn and soybeans. The wetness is the major limitation. A drainage system may increase the effective growing season by lowering the water table.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition and maintain tilth.

This map unit is moderately suited to woodland. The dominant trees are loblolly pine, water oak, sweetgum, and red maple. Hardwoods, such as southern red oak and white oak, can be grown in drained areas. The main understory species include greenbrier, holly, sweetbay, sourwood, sassafras, and giant cane. The wetness limits the use of equipment.

This map unit is poorly suited to most urban and recreational uses. The wetness, the restricted permeability, and low strength are the major limitations.

The capability subclass is IIIw in drained areas and VIw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

HaB—Helena fine sandy loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, deep, moderately well drained Helena and similar soils on toe slopes adjacent to streams along the Cape Fear River west of Lillington. Mapped areas are irregular in shape and range from about 5 to 20 acres in size.

Typically, the surface layer is light yellowish brown fine sandy loam 8 inches thick. The subsoil extends to a depth of 48 inches. The upper part of the subsoil is brownish yellow sandy clay loam and light yellowish brown clay. The next part is light gray clay that has light yellowish brown mottles. The lower part is white sandy clay loam that has pockets of clay and brownish yellow and very pale brown mottles. The underlying material to a depth of 60 inches is white sandy loam that has pockets of clay and brownish yellow mottles.

Permeability is slow. Available water capacity is moderate. The shrink-swell potential is high. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The depth to bedrock ranges from 48 to 80 inches. A perched seasonal high water table is at a depth of 1.5 to 2.5 feet from January through April during most years or after periods of heavy rains.

Included in mapping are small areas of similar soils that have a surface layer of sandy clay loam or clay loam. These soils are in the steeper parts of mapped areas. Also included are areas of similar soils that are somewhat poorly drained to well drained and areas where the depth to bedrock is less than 48 inches. These areas are intermingled throughout the map unit. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as pasture or woodland.

This map unit is moderately suited to the cultivated crops commonly grown in the area. It is seldom cultivated, however, because of the hazard of erosion and the relatively small size of the individual areas.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, Virginia pine, yellow-poplar, and sweetgum are the major canopy trees. The understory trees include dogwood, red maple, holly, and sourwood. No major limitations affect timber production.

This map unit is poorly suited to most urban and recreational uses. The restricted permeability, a moderate or high shrink-swell potential, and the wetness are severe limitations on sites for urban uses and moderate limitations on sites for recreational uses.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

LaB—Lakeland sand, 0 to 8 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, excessively drained Lakeland and

similar soils on broad upland ridges. Mapped areas are irregular in shape and range from about 10 to more than 200 acres in size.

Typically, the surface layer is dark grayish brown sand 6 inches thick. The upper part of the underlying material is yellowish brown sand. The lower part is reddish yellow sand.

Permeability is rapid. Available water capacity is very low. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

Included in mapping are small areas of Blaney and Candor soils. These soils contain less sand than the Lakeland soil and are at the higher elevations. They make up about 20 percent of the map unit.

Most of this map unit is used as woodland. The remaining acreage is used for pasture, hay, or crops; is idle land; or is used for urban development.

This map unit is poorly suited to cultivated crops, such as corn and soybeans. Droughtiness, leaching of plant nutrients, and soil blowing are the major limitations. Conservation tillage and close-growing cover crops help to control soil blowing and reduce leaching.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition. The droughtiness, leaching of plant nutrients, and soil blowing are the major limitations.

This map unit is moderately suited to woodland. The dominant trees are longleaf pine and loblolly pine. The understory species include turkey oak, dogwood, sourwood, and sassafras. Droughtiness is the main limitation. The survival and growth rates of seedlings are improved by bedding and by planting in low areas. The loose sandy surface layer can limit the use of equipment.

This map unit is poorly suited to most urban and recreational uses. Lawns and shrubs require irrigation and frequent applications of lime and fertilizer. The rapid permeability is a limitation affecting onsite sewage disposal. The contamination of ground water is a hazard.

The capability subclass is IVs. Based on longleaf pine as the indicator species, the woodland ordination symbol is 4S.

LnB—Lillington very gravelly sandy loam, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Lillington and similar soils on smooth, convex hills and side slopes in the western part of the county and along the Cape Fear River. Mapped areas are long and narrow or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is brown very gravelly sandy loam 6 inches thick. The subsurface layer is light yellowish brown very gravelly sandy loam 4 inches thick. The subsoil extends to a depth of 66 inches. It is strong brown very gravelly sandy loam in the upper part, red very gravelly sandy clay loam in the next part, and mixed red, reddish yellow, and light yellowish brown extremely gravelly sandy loam in the lower part. The underlying material to a depth of 80 inches is reddish yellow very gravelly sandy loam that has strata of loamy sand and sandy clay loam.

Permeability is moderate. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The content of coarse fragments ranges from 35 to 80 percent in all horizons.

Included in mapping are small areas of Vaucluse, Cecil, Gilead, and Blaney soils. These soils contain few or no coarse fragments. Vaucluse and Cecil soils are near the edge of mapped areas and in the steeper areas. Gilead and Blaney soils are near the center of mapped areas, adjacent to the sandhills. Also included are areas of Lillington soils that do not have a gravelly surface layer. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as cropland. Only a small acreage is used as woodland or pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. Corn, soybeans, tobacco, and small grain are the main crops. Surface runoff, droughtiness, the hazard of erosion, and gravel in the surface layer are the major management concerns if this unit is cultivated. Terraces, field borders, grassed waterways, conservation tillage, and crop residue management help to control runoff and erosion (fig. 6).

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant overstory trees are loblolly pine, longleaf pine, sweetgum, a variety of oaks, and hickory. The understory species include dogwood, American holly, and black cherry. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The high content of coarse fragments is the major limitation. Small stones are a limitation affecting lawns and landscaping and most recreational uses.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

Figure 6.—Contour farming, a grassed waterway, and parallel terraces in an area of Lillington very gravelly sandy loam, 2 to 8 percent slopes. Such conservation practices are common.

LnD—Lillington very gravelly sandy loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Lillington and similar soils on side slopes in the western part of the county and along the Cape Fear River. Mapped areas are long and narrow or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is brown very gravelly sandy loam 6 inches thick. The subsurface layer is light yellowish brown very gravelly sandy loam 4 inches thick. The subsoil extends to a depth of 66 inches. It is strong brown very gravelly sandy loam in the upper part, red very gravelly sandy clay loam in the next part, and mixed red, reddish yellow, and light yellowish brown extremely gravelly sandy loam in the lower part. The underlying material to a depth of 80 inches is reddish yellow very gravelly sandy loam that has strata of loamy sand and sandy clay loam.

Permeability is moderate. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The content of coarse fragments ranges from 35 to 80 percent in all horizons.

Included in mapping are small areas of Vaucluse, Cecil, and Blaney soils. These soils contain few or no coarse fragments. Vaucluse and Cecil soils are near the edge of mapped areas and in the steeper areas. Blaney soils are near the center of mapped areas, adjacent to the sandhills. Also included are areas of Lillington soils that do not have a gravelly surface layer. Included

soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A few small areas are used as cropland or pasture.

This map unit is poorly suited to cultivated crops. Corn, soybeans, and small grain are grown in some areas on these soils. The slope, droughtiness, the high content of gravel, and the hazard of erosion are the major management concerns.

This map unit is moderately suited to hay and pasture. The slope, the droughtiness, and the high content of gravel are the major limitations. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant overstory trees are loblolly pine, longleaf pine, sweetgum, a variety of oaks, and hickory. The understory species include dogwood, American holly, and black cherry. No major limitations affect timber production.

This map unit is poorly suited to most urban and recreational uses. The slope and small stones in the surface layer are the major limitations.

The capability subclass is IVs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

LnE—Lillington very gravelly sandy loam, 15 to 25 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Lillington and similar soils on side slopes in the western part of the county and along the Cape Fear River. Mapped areas are long and narrow or irregular in shape and range from about 10 to 300 acres in size.

Typically, the surface layer is brown very gravelly sandy loam 6 inches thick. The subsurface layer is light yellowish brown very gravelly sandy loam 4 inches thick. The subsoil extends to a depth of 66 inches. It is strong brown very gravelly sandy loam in the upper part, red very gravelly sandy clay loam in the next part, and mixed red, reddish yellow, and light yellowish brown extremely gravelly sandy loam in the lower part. The underlying material to a depth of 80 inches is reddish yellow very gravelly sandy loam that has strata of loamy sand and sandy clay loam.

Permeability is moderate. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The content of coarse fragments ranges from 35 to 80 percent in all horizons.

Included in mapping are small areas of Vaucluse, Cecil, and Nason soils. These soils contain few or no coarse fragments. Vaucluse soils are adjacent to the sandhills. Cecil and Nason soils are near the edge of mapped areas and in the steeper areas. Also included are areas of Lillington soils that do not have a gravelly surface layer. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A few small areas are used for pasture.

This map unit is poorly suited to cultivated crops. The slope, droughtiness, the high content of gravel, and the hazard of erosion are the major management concerns.

This map unit is poorly suited to hay and pasture. The slope, the droughtiness, and the high content of gravel are the major limitations. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant overstory trees are loblolly pine, longleaf pine, sweetgum, a variety of oaks, and hickory. The understory species include dogwood, American holly, and black cherry. The slope and the moderate equipment limitation are the major management concerns affecting timber production.

This map unit is poorly suited to most urban and recreational uses. The slope and small stones in the surface layer are the major limitations.

The capability subclass is VIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9R.

LoF—Louisa fine sandy loam, 25 to 45 percent slopes. This map unit consists mainly of steep, shallow, somewhat excessively drained Louisa and similar soils on side slopes along major drainageways in the Piedmont uplands. Mapped areas are long, very narrow bands that range from about 5 to more than 50 acres in size.

Typically, the surface layer is brown fine sandy loam 2 inches thick. The subsurface layer is grayish brown fine sandy loam 5 inches thick. The subsoil is about 8 inches of yellowish brown loam that has a few pockets of sandy clay loam. Soft, pale brown and light brownish gray, micaceous schist is between depths of 15 and 32 inches.

Permeability is moderately rapid. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid. The depth to soft bedrock is 10 to 20 inches.

Included in mapping are small areas of Pacolet and Nason soils. These soils are on the lower or upper side slopes. They have a continuous layer of clayey material in the subsoil and are deeper over bedrock than the Louisa soil. They make up about 20 percent of the map unit.

Most of this map unit is native woodland. A few areas are used for pasture.

This map unit is poorly suited to cultivated crops. The slope and the severe hazard of erosion are the major management concerns.

This map unit is poorly suited to hay and pasture. Intensive management practices are needed to help control erosion and to maintain the stand of grasses and legumes. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The slope is a major limitation affecting the use of equipment.

This map unit is moderately suited to woodland. Most areas support mixed hardwoods and a few pines and cedars. These areas are mostly on north-facing slopes, which have a cooler microclimate than south-facing slopes. The understory species mainly are laurels and other shrubs and herbs common to cool, moist sites. This map unit is best suited to pines, yellow-poplar, and red cedar. Because of the severe hazard of erosion and a severe equipment limitation, woodland management is difficult.

This map unit is poorly suited to most urban and recreational uses. The major management concerns include the slope, the hazard of erosion, and the depth to bedrock.

The capability subclass is VIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7R.

Ly—Lynchburg sandy loam. This map unit consists mainly of nearly level, very deep, somewhat poorly drained Lynchburg and similar soils in upland depressions, at the head of small drainageways, and on smooth flats near streams in the uplands. It is north of the Cape Fear River in the eastern part of the county; on broad, flat ridges in the western part of the county; north of the Upper Little River; and in the Bunnlevel area. Mapped areas are oval or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is very dark gray sandy loam 6 inches thick. The subsoil extends to a depth of 72 inches. The upper part is light yellowish brown sandy clay loam. The next part is gray sandy clay loam that has brownish yellow and yellowish brown mottles. The lower part is gray, yellowish brown, and red sandy clay loam.

Permeability is moderate. Available water capacity is high. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet from November through April during most years and after periods of heavy rainfall.

Included in mapping are small areas of soils that contain more clay than the Lynchburg soil. These soils are intermingled with areas of the Lynchburg soil. Also included are small areas of Goldsboro, Rains, Bibb, and Nahunta soils. Goldsboro soils are moderately well drained. They generally are along the outer edge of mapped areas. Rains soils are poorly drained. They are in depressions, usually near the center of mapped areas. Bibb soils are poorly drained. They are along small streams and drainageways. Nahunta soils are intermingled with areas of the Lynchburg soil. They contain more silt than the Lynchburg soil. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as cropland or pasture. The remaining acreage is used as woodland.

If this map unit is properly drained, it is moderately suited to the cultivated crops commonly grown in the area. Corn, soybeans, and small grain are the major crops. The wetness is the major limitation affecting crop production.

This map unit is well suited to hay and pasture. The wetness is the major limitation. A surface and subsurface drainage system may be necessary to obtain a high level of production. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Sweetgum, yellow-poplar, sycamore, and loblolly pine are the major canopy species. The understory species include red maple, American holly, and a variety of vines and evergreen shrubs. The use of equipment may be restricted to dry periods because of the seasonal high water table.

This map unit is poorly suited to most urban and recreational uses. The wetness and a slow runoff rate are severe limitations affecting urban and recreational uses.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

MaA—Marlboro sandy loam, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, well drained Marlboro and similar soils on broad ridges in the uplands. It is mainly in the eastern part of the county, north of the Cape Fear River. Mapped areas are irregular in shape and range from about 10 to 50 acres in size.

Typically, the surface layer is dark brown sandy loam 7 inches thick. The subsurface layer is light yellowish brown sandy loam 3 inches thick. The subsoil is brownish yellow sandy clay loam in the upper part, yellowish brown sandy clay and clay loam in the next

part, and strong brown, red, and light gray sandy clay loam in the lower part to a depth of 80 inches.

Permeability is moderate. Available water capacity also is moderate. Reaction is strongly acid to slightly acid in the surface layer, except where limed, and very strongly acid to moderately acid in the subsoil.

Included in mapping are small areas of Aycock, Norfolk, Goldsboro, Orangeburg, and Wagram soils. Orangeburg soils have less clay than the Marlboro soil and are in the slightly convex areas. Aycock, Norfolk, and Wagram soils have less clay than the Marlboro soil. They are intermingled with areas of the Marlboro soil. Goldsboro soils are moderately well drained. They are in slight depressions or adjacent to wet areas. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. A few areas are used as woodland.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, small grain, tobacco, and truck crops. Conservation tillage, cover crops, and a cropping sequence that includes close-growing grasses and legumes help to maintain tilth and conserve moisture.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant trees are loblolly pine, southern red oak, white oak, black oak, and hickory. The main understory species include dogwood, holly, sassafras, and black cherry. No major limitations affect timber production.

This map unit is well suited to most urban and recreational uses. The restricted permeability may be a limitation on sites for septic tank absorption fields.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

MaB—Marlboro sandy loam, 2 to 6 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Marlboro and similar soils on broad ridges in the uplands. It is mainly in the eastern part of the county, north of the Cape Fear River. Mapped areas are irregular in shape and range from about 5 to 50 acres in size.

Typically, the surface layer is dark brown sandy loam 7 inches thick. The subsurface layer is light yellowish brown sandy loam 3 inches thick. The subsoil is brownish yellow sandy clay loam in the upper part, yellowish brown sandy clay and clay loam in the next part, and strong brown, red, and light gray sandy clay loam in the lower part to a depth of 80 inches.

Permeability is moderate. Available water capacity also is moderate. Reaction is strongly acid to slightly acid in the surface layer, except where limed, and very strongly acid to moderately acid in the subsoil.

Included in mapping are small areas of Aycock, Norfolk, Goldsboro, Orangeburg, and Wagram soils. Orangeburg soils have less clay than the Marlboro soil. They are in the slightly convex areas. Aycock, Norfolk, and Wagram soils have less clay than the Marlboro soil. They are intermingled with areas of the Marlboro soil. Goldsboro soils are moderately well drained. They are in slight depressions or adjacent to wet areas. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. A few areas are used as woodland.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, small grain, tobacco, and truck crops. Conservation tillage, cover crops, and a cropping sequence that includes close-growing grasses and legumes help to maintain tilth and conserve moisture.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant trees are loblolly pine, southern red oak, white oak, black oak, and hickory. The main understory species include dogwood, holly, sassafras, and black cherry. No major limitations affect timber production.

This map unit is well suited to most urban and recreational uses. The restricted permeability may be a limitation on sites for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Na—Nahunta loam. This map unit consists mainly of nearly level, very deep, somewhat poorly drained Nahunta and similar soils on broad flats and in shallow depressions. It is mainly south of Lillington between the Cape Fear River and U.S. Highway 401. Mapped areas are irregular in shape and range from about 10 to 50 acres in size.

Typically, the surface layer is very dark gray loam 5 inches thick. The subsurface layer is pale brown loam 2 inches thick. The subsoil extends to a depth of 80 inches. The upper part is light yellowish brown silty clay loam that has brown mottles. The lower part is light gray silty clay loam or clay loam that has yellow or brown mottles.

Permeability is moderately slow. Available water capacity is high. The surface layer is very strongly acid to moderately acid, except where limed. The subsoil is extremely acid or very strongly acid. The seasonal high

water table is at a depth of 1.0 foot to 2.5 feet from December through May during most years and after periods of heavy rainfall.

Included in mapping are small areas of Lynchburg, Grantham, Exum, and Goldsboro soils. Lynchburg soils contain less silt than the Nahunta soil. They are intermingled with areas of the Nahunta soil. Grantham soils are poorly drained. They are in depressions. Exum and Goldsboro soils are moderately well drained. They are in the slightly higher areas. Included soils make up about 15 percent of the map unit.

Most of this map unit is native forest. A few areas are used as cropland or pasture.

If this map unit is properly drained, it is moderately suited to the cultivated crops commonly grown in the area. Some areas have been intensively drained and are used as cropland. Corn, soybeans, and small grain are the main crops. A drainage system that includes open ditches and land grading improves surface drainage. If such a system is installed, this soil can produce high yields.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The wetness is the major limitation.

This map unit is well suited to woodland. The major canopy trees are loblolly pine, sweetgum, and pin oak. The important understory species are switchcane and greenbrier. Wooded areas are important as habitat for deer, raccoon, fox, rabbit, opossum, birds, and other wildlife. The wetness limits the use of some equipment after periods of heavy rain and during late winter and early spring.

This map unit is poorly suited to most urban and recreational uses. It generally is not used as a site for residential or recreational development because of the wetness and the restricted permeability.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

NeD—Nason silt loam, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, deep, well drained Nason and similar soils on side slopes. It is in the western part of the county, along the Upper Little River and the Cape Fear River west of Buies Creek. Mapped areas are long and narrow and range from about 10 to 100 acres in size.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil extends to a depth of 34 inches. The upper part is strong brown clay that has yellowish brown and red mottles, and the lower part is strong brown silty clay loam that has brownish yellow and light gray mottles. The underlying material to a depth of 44 inches is multicolored silt loam saprolite. Soft phyllite is at a depth of 44 to 60 inches.

Permeability is moderate. Available water capacity also is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The depth to soft bedrock ranges from 40 to more than 60 inches.

Included in mapping are some areas that have a gravelly surface layer and some areas with a surface layer of loamy sand that are adjacent to the Coastal Plain. Also included are small areas of Pacolet, Cecil, Louisa, and Norfolk soils. Pacolet soils are very deep and are intermingled with areas of the Nason soil. Cecil soils are deep and are in the less sloping areas. Louisa soils are shallow and are usually on very narrow, short slopes adjacent to flood plains. Norfolk soils are very deep and contain less clay than the Nason soil. They are in areas adjacent to the Coastal Plain. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. Some areas are used for pasture. A few areas are used as cropland.

This map unit is moderately suited to the cultivated crops commonly grown in the area but is seldom cultivated because of the severe hazard of erosion. Applications of fertilizer, conservation tillage, cover crops, and crop residue management conserve soil moisture and improve yields. The slope is the major limitation.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The slope limits the use of equipment in some areas.

This map unit is well suited to woodland. Loblolly pine, a variety of oaks, yellow-poplar, sweetgum, and hickory are the major canopy trees. The understory trees include dogwood, American holly, red cedar, black cherry, and red maple. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The slope, low strength, the clayey subsoil, the hazard of erosion, and depth to bedrock are the major management concerns.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NeE—Nason silt loam, 15 to 25 percent slopes. This map unit consists mainly of moderately steep, deep, well drained Nason and similar soils on side slopes. It is in the western part of the county, along the Upper Little River and the Cape Fear River west of

Buies Creek. Mapped areas are long and narrow and range from about 20 to 90 acres in size.

Typically, the surface layer is brown silt loam 6 inches thick. The subsoil extends to a depth of 34 inches. The upper part is strong brown clay that has yellowish brown and red mottles, and the lower part is strong brown silty clay loam that has brownish yellow and light gray mottles. The underlying material to a depth of 44 inches is multicolored silt loam saprolite. Soft phyllite is at a depth of 44 to 60 inches.

Permeability is moderate. Available water capacity also is moderate. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The depth to soft bedrock ranges from 40 to more than 60 inches.

Included in mapping are some areas that have a gravelly surface layer or that are less than 40 inches deep over bedrock, widely scattered areas of rock outcrop, and areas with a surface layer of loamy sand that are adjacent to the Coastal Plain. Also included are small areas of Pacolet, Cecil, and Louisa soils. Pacolet soils are very deep and are intermingled with areas of the Nason soil. Cecil soils are deep and are in the less sloping areas. Louisa soils are shallow and are usually on very narrow, short slopes in the steeper areas. Included soils make up about 20 percent of the map unit.

This map unit is poorly suited to the cultivated crops commonly grown in the area. It is seldom cultivated because of the severe hazard of erosion. The slope is the major management concern.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition. The slope may limit the use of equipment.

This map unit is moderately suited to woodland. Loblolly pine, a variety of oaks, yellow-poplar, sweetgum, and hickory are the major canopy trees. The understory trees include dogwood, American holly, red cedar, black cherry, and red maple. The slope is a limitation affecting the use of equipment.

This map unit is poorly suited to most urban and recreational uses. The slope, low strength, the clayey subsoil, the hazard of erosion, and depth to bedrock are the major management concerns.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 6R.

NoA—Norfolk loamy sand, 0 to 2 percent slopes. This map unit consists mainly of nearly level, very deep, well drained Norfolk and similar soils on broad, smooth flats in the uplands. Mapped areas are irregular in shape and range from about 5 to more than 200 acres in size.

Typically, the surface layer is brown loamy sand 7 inches thick. The subsurface layer is light yellowish brown loamy sand 4 inches thick. The subsoil extends to a depth of 80 inches. The upper part is brownish yellow sandy loam. The next part is yellowish brown and strong brown sandy clay loam. The lower part is strong brown sandy clay loam that has red and light gray mottles.

Permeability is moderate. Available water capacity also is moderate. Reaction is extremely acid to moderately acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 4 to 6 feet from January through March during most years.

Included in mapping are small areas of Goldsboro, Aycock, Marlboro, Wagram, Orangeburg, and Dothan soils. Goldsboro soils are moderately well drained. They are in slight depressions or on the lower slopes. Aycock, Marlboro, and Wagram soils are intermingled with areas of the Norfolk soil. Aycock soils contain more silt than the Norfolk soil, Marlboro soils contain more clay, and Wagram soils contain more sand. Orangeburg soils have a redder subsoil than that of the Norfolk soil and are in the slightly convex areas adjacent to side slopes. Dothan soils have more than 5 percent plinthite in the subsoil and are intermingled with areas of the Norfolk soil at an elevation of more than 265 feet. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. A few small areas are used as woodland or pasture. Many areas are used for urban development.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, small grain, tobacco, cotton, and truck crops. Conservation tillage, cover crops, and a cropping sequence that includes close-growing grasses and legumes help to maintain tilth and conserve moisture.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant overstory trees are loblolly pine, white oak, southern red oak, black oak, and hickory. The main understory species include holly, dogwood, persimmon, and sassafras. No major limitations affect timber production.

This map unit is well suited to most urban and recreational uses. In some areas the wetness is a limitation on sites for buildings with basements and on sites for septic tank absorption fields.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NoB—Norfolk loamy sand, 2 to 6 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Norfolk and similar soils on broad, smooth flats in the uplands. Mapped areas are irregular in shape and range from about 5 to more than 100 acres in size.

Typically, the surface layer is brown loamy sand 7 inches thick. The subsurface layer is light yellowish brown loamy sand 4 inches thick. The subsoil extends to a depth of 80 inches. The upper part is brownish yellow sandy loam. The next part is yellowish brown and strong brown sandy clay loam. The lower part is strong brown sandy clay loam that has red and light gray mottles.

Permeability is moderate. Available water capacity also is moderate. Reaction is extremely acid to moderately acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 4 to 6 feet from January through March during most years.

Included in mapping are small areas of Goldsboro, Aycock, Marlboro, Wagram, Orangeburg, and Dothan soils. Goldsboro soils are moderately well drained. They are in slight depressions or on the lower slopes. Aycock, Marlboro, and Wagram soils are intermingled with areas of the Norfolk soil. Aycock soils contain more silt than the Norfolk soil, Marlboro soils contain more clay, and Wagram soils contain more sand. Orangeburg soils have a redder subsoil than that of the Norfolk soil and are in the slightly convex areas adjacent to side slopes. Dothan soils have more than 5 percent plinthite in the subsoil and are intermingled with areas of the Norfolk soil at an elevation of more than 265 feet. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. A few small areas are used as woodland or pasture. Many areas are used for urban development.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, small grain, tobacco, cotton, and truck crops. The hazard of erosion is the main management concern. Conservation tillage, cover crops, and a cropping sequence that includes close-growing grasses and legumes help to maintain tilth and conserve moisture.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant overstory trees are loblolly pine, white oak, southern red oak, black oak, and hickory. The main understory species include holly, dogwood, persimmon, and sassafras. No major limitations affect timber production.

This map unit is well suited to most urban and recreational uses. In some areas the wetness is a limitation on sites for buildings with basements and on sites for septic tank absorption fields.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NoC—Norfolk loamy sand, 6 to 10 percent slopes. This map unit consists mainly of gently sloping to strongly sloping, very deep, well drained Norfolk and similar soils on side slopes in the uplands. Mapped areas are irregular in shape and range from about 5 to more than 100 acres in size.

Typically, the surface layer is brown loamy sand 7 inches thick. The subsurface layer is light yellowish brown loamy sand 4 inches thick. The subsoil extends to a depth of 80 inches. The upper part is brownish yellow sandy loam. The next part is yellowish brown and strong brown sandy clay loam. The lower part is strong brown sandy clay loam that has red and light gray mottles.

Permeability is moderate. Available water capacity also is moderate. Reaction is extremely acid to moderately acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 4 to 6 feet from January through March during most years.

Included in mapping are small areas of Goldsboro, Aycock, Marlboro, Wagram, Orangeburg, and Dothan soils. Goldsboro soils are moderately well drained. They are in slight depressions or on the lower slopes. Aycock, Marlboro, and Wagram soils are intermingled with areas of the Norfolk soil. Aycock soils contain more silt than the Norfolk soil, Marlboro soils contain more clay, and Wagram soils contain more sand. Orangeburg soils have a redder subsoil than that of the Norfolk soil and are in the slightly convex areas adjacent to side slopes. Dothan soils have more than 5 percent plinthite in the subsoil and are intermingled with areas of the Norfolk soil at an elevation of more than 265 feet. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. A few small areas are used as woodland or pasture. Many areas are used for urban development.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn, soybeans, small grain, tobacco, cotton, and truck crops. Erosion is the

main hazard. Conservation tillage, cover crops, stripcropping, field borders, crop residue management, and contour farming help to maintain tilth and conserve moisture.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant overstory trees are loblolly pine, white oak, southern red oak, black oak, and hickory. The main understory species include holly, dogwood, persimmon, and sassafras. No major limitations affect timber production.

This map unit is well suited to most urban and recreational uses. In some areas the wetness is a limitation on sites for buildings with basements and on sites for septic tank absorption fields. The slope is a limitation affecting some uses.

The capability subclass is IIIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

NuB—Norfolk-Urban land complex, 0 to 6 percent slopes. This map unit consists of areas of Norfolk and similar soils and areas of Urban land. The soils and Urban land that make up this unit occur as areas so small and intermingled that mapping them separately was not feasible at the scale selected. This unit is about 45 percent Norfolk soil and 35 percent Urban land. The well drained Norfolk and similar soils are in open, relatively undisturbed areas. This unit is most extensive in and around the towns of Dunn, Erwin, and Buies Creek. Mapped areas are irregular in shape and range from about 10 to more than 100 acres in size.

Typically, the surface layer of the Norfolk soil is brown loamy sand 7 inches thick. The subsurface layer is light yellowish brown loamy sand 4 inches thick. The subsoil extends to a depth of 80 inches. The upper part is brownish yellow sandy loam. The next part is yellowish brown and strong brown sandy clay loam. The lower part is strong brown sandy clay loam that has red and light gray mottles.

Permeability is moderate in the Norfolk soil. Available water capacity also is moderate. Reaction is extremely acid to moderately acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 4 to 6 feet from January through March during most years.

Urban land consists of areas where the soil has been covered by concrete, asphalt, buildings, or other impervious surfaces. The slope has been modified and commonly ranges from 0 to 4 percent.

Included in mapping are small areas of Goldsboro, Aycock, Marlboro, Wagram, Orangeburg, and Dothan soils. Goldsboro soils are moderately well drained. They are in slight depressions or on the lower slopes. Aycock, Marlboro, and Wagram soils are intermingled with areas of the Norfolk soil. Aycock soils contain more silt than the Norfolk soil, Marlboro soils contain more clay, and Wagram soils contain more sand. Orangeburg soils have a redder subsoil than that of the Norfolk soil and are in the slightly convex areas adjacent to side slopes. Dothan soils have more than 5 percent plinthite in the subsoil and are intermingled with areas of the Norfolk soil at an elevation of more than 265 feet. Included soils make up about 20 percent of the map unit.

This map unit is poorly suited to cultivated crops, hay, and pasture because of the small size of the areas of soil. These small areas, however, are well suited to gardens, vegetable crops, trees, and shrubs.

This map unit is well suited to most urban and recreational uses. The wetness is a limitation on sites for buildings with basements and on sites for septic tank absorption fields.

The Norfolk soil is in capability subclass IIe. The Urban land is in capability subclass VIIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of the Norfolk soil is 8A. The Urban land has not been assigned a woodland ordination symbol.

OrB—Orangeburg loamy sand, 2 to 6 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Orangeburg and similar soils on the slightly convex divides in the uplands and side slopes between the nearly level areas and drainageways or bays. Mapped areas are linear or irregular in shape and range from about 5 to more than 40 acres in size.

Typically, the surface layer is brown loamy sand 8 inches thick. The subsurface layer is light yellowish brown loamy sand 11 inches thick. The subsoil extends to a depth of 80 inches. The upper part is strong brown sandy loam, and the lower part is red sandy clay loam.

Permeability is moderate. Available water capacity also is moderate. Reaction ranges from very strongly acid to moderately acid in the surface layer and the upper part of the subsoil, except where the surface layer has been limed. The lower part of the subsoil is very strongly acid or strongly acid. The seasonal high water is below a depth of 6 feet, except for short intermittent periods during late winter and early spring.

Included in mapping are small areas of Norfolk, Aycock, Marlboro, and Wagram soils. These soils generally are in the more level areas. Norfolk soils have a browner subsoil than that of the Orangeburg soil.

Aycock soils have more silt than the Orangeburg soil, Marlboro soils have more clay, and Wagram soils have more sand in the surface layer. Also included are small eroded spots that have a surface layer of sandy clay loam. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. The remaining acreage is mainly woodland or used for urban development.

This map unit is well suited to the cultivated crops grown in the area, such as tobacco, soybeans, corn, small grain, cotton, and truck crops. Erosion is the main hazard. Conservation tillage, cover crops, stripcropping, field borders, crop residue management, and contour farming help to control erosion.

This map unit is well suited to hay and pasture. Establishing pasture or hayland is an effective method of controlling erosion. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant overstory trees are loblolly pine, white oak, southern red oak, and hickory. The main understory species include holly, dogwood, persimmon, and sassafras. No major limitations affect timber production.

This map unit is well suited to most urban and recreational uses. No significant limitations affect these uses.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

PaE—Pacolet fine sandy loam, 15 to 25 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Pacolet and similar soils. It is on side slopes along the Upper Little River and the Cape Fear River west of Lillington. Mapped areas are long and narrow and range from about 20 to 90 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 3 inches thick. The subsurface layer is pale brown fine sandy loam 3 inches thick. The subsoil to a depth of 29 inches is yellowish red and red clay or clay loam. The underlying material to a depth of 60 inches is reddish yellow or multicolored fine sandy loam saprolite.

Permeability is moderate. Available water capacity also is moderate. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

Included in mapping are small areas that have a gravelly surface layer and some areas that have stones and boulders on the surface. The stones and boulders range from 1 to 3 feet in diameter. Some areas have bedrock within a depth of 60 inches. Rock outcrop is in widely scattered areas. Also included are small areas of Cecil, Nason, and Louisa soils. Cecil soils have a thicker subsoil than that of the Pacolet soil and are in the less sloping areas. Nason soils have a more plastic subsoil than that of the Pacolet soil. They are intermingled with areas of the Pacolet soil. Louisa soils are shallow over bedrock and are in the steeper areas. Included soils make up about 20 percent of the map unit.

This map unit is poorly suited to the cultivated crops commonly grown in the area. The severe hazard of erosion and the slope are the major management concerns.

This map unit is moderately suited to hay and pasture. Erosion is not as serious a hazard in the areas used as pasture if stands of grass are maintained. The slope limits the use of equipment in many areas. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, a variety of oaks, yellow-poplar, sweetgum, and hickory are the major canopy trees. The understory species include dogwood, American holly, red cedar, black cherry, red maple, and laurel. The slope is a moderate limitation affecting the use of equipment.

This map unit is poorly suited to most urban and recreational uses. The slope is the main limitation. Silt fences and sedimentation basins commonly are necessary to control erosion on construction sites.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8A.

Pc—Pactolus loamy sand, rarely flooded. This map unit consists mainly of nearly level, very deep, moderately well drained or somewhat poorly drained Pactolus and similar soils. It is mostly on terraces along small streams. Mapped areas are irregular in shape and range from about 5 to more than 75 acres in size.

Typically, the surface layer is pale brown loamy sand 10 inches thick. The underlying material is yellowish brown loamy sand and brownish yellow sand in the upper part, light brownish gray sand in the next part, and light gray sand in the lower part to a depth of 70 inches.

Permeability is rapid. Available water capacity is low. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 1.5 to 3.0 feet from December through April during most years.

Included in mapping are small areas of Alpin soils. These soils are excessively drained and are intermingled with areas of the Pactolus soil or are at the

higher elevations. Also included are small areas of similar soils that are poorly drained. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. The remaining acreage is mainly woodland.

This map unit is poorly suited to cultivated crops, such as corn, soybeans, small grain, and tobacco. The main limitation is the low available water capacity. Conservation tillage, crop residue management, windbreaks, and a cropping sequence that includes close-growing grasses and legumes help to conserve moisture, reduce leaching, and control soil blowing.

This map unit is moderately suited to hay and pasture. Establishing pasture or hayland is a good way to conserve soil and water. This unit is best suited to forage plants, such as coastal bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant trees are loblolly pine, sweetgum, water oak, maple, and blackgum. The main understory species include holly, blueberry, greenbrier, sourwood, and switchcane. The wetness may restrict the use of equipment.

This map unit is poorly suited to most urban and recreational uses. The wetness and flooding are the main management concerns.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9S.

Pd—Pits-Dumps complex. This map unit consists of miscellaneous areas throughout the county that have been altered to such an extent that the soil cannot be identified. Most of these areas are open pits that have been excavated for sand and gravel to a depth of several feet (fig. 7). This unit also includes areas around the pits where the sand and gravel has been stockpiled.

This unit is so variable that onsite examinations should be made before making land use decisions.

The capability subclass is VIIIs. This map unit has not been assigned a woodland ordination symbol.

Pf—Pocalla loamy sand, 0 to 6 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, somewhat excessively drained Pocalla and similar soils on broad, smooth flats in the uplands. It is most extensive in the southwestern and western parts of the county at an elevation of more than 265 feet. Mapped areas are irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is grayish brown loamy sand 10 inches thick. The subsurface layer is very pale brown loamy sand 11 inches thick. The upper subsoil is brownish yellow sandy loam. Below this is a layer of very pale brown loamy sand. The lower subsoil to a depth of 85 inches is yellowish brown sandy clay loam that has light gray mottles.

Permeability is moderately rapid in the upper subsoil and moderate in the lower subsoil. Available water capacity is low. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. A perched seasonal high water table is at a depth of 4 to 6 feet from December through March during most years.

Included in mapping are a few areas of similar soils that have a surface layer of sand or loamy sand that is less than 20 inches thick. Also included are small areas of Lakeland, Candor, Norfolk, and Wagram soils. Lakeland and Candor soils have more sand than the Pocalla soil, Norfolk soils have less sand, and Wagram soils have a thicker subsoil. These soils are typically intermingled with areas of the Pocalla soil. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops. The remaining acreage is mainly woodland or pasture.

This map unit is well suited to cultivated crops, such as corn, soybeans, tobacco, and small grain. Leaching of plant nutrients, soil blowing, and the low available water capacity are the main limitations. Blowing sand may damage young plants. Winter cover crops, conservation tillage, and crop residue management help to maintain the content of organic matter and to conserve moisture. No-till planting, windbreaks, and a crop rotation that includes close-growing crops conserve soil and water. Fertilizers, particularly nitrogen, should be added in split applications.

This map unit is well suited to hay and pasture. Establishing hayland or pasture is an effective method of conserving soil and water. This unit is best suited to forage plants, such as coastal bermudagrass and bahiagrass. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The dominant trees are longleaf pine, loblolly pine, blackjack oak, and hickory. The main understory species include sassafras, dogwood, and turkey oak. The equipment limitation and seedling mortality are the main management concerns.

This map unit is well suited to most urban uses. Lawns and shrubs may be difficult to establish and maintain because of the leaching of plant nutrients and droughtiness. Seepage and the instability of ditchbanks and trench walls are limitations. This soil is suited to

Figure 7.—An area of the Pits-Dumps complex. About 3,700 acres in Harnett County is mined for sand and gravel.

recreational uses. The sandy soil material is the main limitation.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

Pn—Polawana loamy sand, frequently flooded. This map unit consists mainly of nearly level, very deep, very poorly drained Polawana and similar soils on low stream terraces along the Lower Little and Upper Little Rivers in the southern part of the county. Mapped areas are long and narrow or irregular in shape and range from 40 to 80 acres in size.

Typically, the surface layer is black loamy sand 10 inches thick. The subsurface layer is fine sand 17 inches thick. It is very dark grayish brown in the upper part and dark reddish brown in the lower part. The underlying material to a depth of 62 inches is dark reddish brown and dark brown fine sand.

Permeability is rapid. Available water capacity is low. Reaction is very strongly acid to neutral. The seasonal high water table is 1.0 foot above the surface to 0.5 foot below from November through April during most years. This soil is subject to frequent flooding for very long

periods from December through March during most years.

Included in mapping are small areas that have an organic surface layer and areas in which the black surface layer is less than 12 inches thick. Also included are small areas of Portsmouth, Roanoke, and Augusta soils. Portsmouth and Augusta soils have less sand than the Polawana soil, and Roanoke soils have more clay and are poorly drained. Augusta soils are somewhat poorly drained. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A few small areas are used as cropland or pasture.

If this map unit is properly drained and protected from flooding, it is moderately suited to the cultivated crops commonly grown in the area. Weed control may be difficult because the content of organic matter in the surface layer is sufficiently high to limit the effectiveness of many herbicides.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is poorly suited to woodland. Although potential productivity is high, a severe equipment limitation and seedling mortality are problems in areas that do not have adequate surface drainage. The dominant overstory species are gums, yellow-poplar, sycamore, Atlantic white cedar, cypress, and loblolly pine. The understory species include red maple, American holly, and a variety of vines and evergreen shrubs.

This map unit is poorly suited to most urban and recreational uses. The very poor drainage, the wetness, the flooding, and ponding are severe limitations on sites for urban and recreational uses.

The capability subclass is Vlw. Based on sweetgum as the indicator species, the woodland ordination symbol is 7W.

Ps—Portsmouth loam, rarely flooded. This map unit consists mainly of nearly level, very deep, very poorly drained Portsmouth and similar soils on low stream terraces along the major streams and their tributaries in the eastern and southern parts of the county. Mapped areas are elongated or irregular in shape and range from about 20 to 60 acres in size.

Typically, the surface layer is black loam 22 inches thick. The subsoil is light brownish gray sandy clay loam to a depth of 38 inches. The underlying material is gray sand to a depth of 72 inches.

Permeability is moderate. Available water capacity also is moderate. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at or near the surface from November through April during most years. This soil is subject to rare flooding.

Included in mapping are areas that have an organic surface layer and areas where the black surface layer is less than 12 inches thick. Small areas of Polawana, Roanoke, and Augusta soils are intermingled with areas of the Portsmouth soil. Polawana soils have more sand than the Portsmouth soil, and Roanoke soils are poorly drained and have more clay. Augusta soils are less sandy than the Polawana soil and are somewhat poorly drained. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. A few small areas are used as cropland.

If this map unit is properly drained, it is moderately suited to the cultivated crops commonly grown in the area. Weed control may be difficult because the content of organic matter in the surface layer is sufficiently high to limit the effectiveness of many herbicides.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is poorly suited to woodland. Although potential productivity is high, a severe equipment limitation and seedling mortality are problems in areas that do not have adequate surface drainage. The dominant overstory species are gums, yellow-poplar, sycamore, Atlantic white cedar, cypress, and loblolly pine. The understory species include red maple, American holly, and a variety of vines and evergreen shrubs.

This map unit is poorly suited to most urban and recreational uses. The poor drainage, the wetness, and the very slow rate of surface runoff are severe limitations on sites for urban and recreational uses.

The capability subclass is Vlw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 11W.

Ra—Rains sandy loam. This map unit consists mainly of nearly level, very deep, poorly drained Rains and similar soils in depressions and on smooth flats near streams in the uplands. It is in the eastern part of the county, north of the Cape Fear River on high, broad, flat ridges; in the western part of the county, north of the Upper Little River; and in the Bunnlevel area. Mapped areas are oval or irregular in shape and range from about 5 to 40 acres in size.

Typically, the surface layer is dark gray sandy loam 10 inches thick. The subsoil extends to a depth of 64 inches. The upper part is gray sandy clay loam that has yellowish brown and very pale brown mottles. The lower

part is gray sandy clay loam. The underlying material to a depth of 72 inches is light gray sandy loam.

Permeability is moderate. Available water capacity is high. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The seasonal high water table is at or near the surface from November through April during most years. Areas in Carolina bays may be ponded following heavy rainfall.

Included in mapping are small areas of Lynchburg, Portsmouth, and Bibb soils. Lynchburg soils are somewhat poorly drained. They are along the outer edge of mapped areas. Portsmouth soils are very poorly drained. They are near the center of the mapped areas or at the base of side slopes. Bibb soils have less clay than the Rains soil and are along small drainageways. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as cropland or pasture. A small area supports native trees.

If this map unit is properly drained, it is moderately suited to the cultivated crops commonly grown in the area. Corn, soybeans, and small grain are the major crops. A drainage system that includes open ditches helps to lower the water table and to drain surface water more rapidly. Suitable outlets are not available in some areas. Even where the soils are drained, tillage can be delayed in spring because of wetness.

This map unit is moderately suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. A severe equipment limitation and seedling mortality are problems in areas that do not have adequate surface drainage. Gums, yellow-poplar, sycamore, and loblolly pine are the major canopy species. The understory species include red maple, American holly, and a variety of vines and ground cover shrubs.

This map unit is poorly suited to most urban and recreational uses. The wetness and the slow rate of surface runoff are severe limitations on sites for urban and recreational uses.

The capability subclass is IIIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 10W.

Rb—Rains-Urban land complex. This map unit consists of areas of Rains and similar soils and Urban land. The soils and Urban land that make up this unit occur as areas so small and intermingled that mapping them separately was not feasible at the scale selected. This unit is about 45 percent Rains soils and 35 percent Urban land. The poorly drained Rains and similar soils are in open, relatively undisturbed areas. This unit is most extensive in and around the towns of Dunn and Erwin. Mapped areas are irregular in shape and range from about 10 to more than 100 acres in size.

Typically, the surface layer of the Rains soil is dark gray sandy loam 10 inches thick. The subsoil extends to a depth of 64 inches. The upper part is gray sandy clay loam that has yellowish brown and very pale brown mottles. The lower part is gray sandy clay loam. The underlying material to a depth of 72 inches is light gray sandy loam.

Permeability is moderate in the Rains soil. Available water capacity is high. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed. The seasonal high water table is at or near the surface from November through April during most years.

Urban land consists of areas where the soil has been covered by concrete, asphalt, buildings, or other impervious surfaces. The slope has been modified and commonly ranges from 0 to 4 percent.

Included in mapping are small areas of Lynchburg, Portsmouth, and Bibb soils. Lynchburg soils are somewhat poorly drained. They are along the outer edge of mapped areas. Portsmouth soils are very poorly drained. They are near the center of the mapped areas or at the base of side slopes. Bibb soils have less clay than the Rains soil and are along small drainageways. Included soils make up about 20 percent of the map unit.

This map unit is poorly suited to cultivated crops, hay, and pasture because of the small size of the areas of soil. These small areas, however, are suited to gardens, vegetable crops, trees, and shrubs.

This map unit is poorly suited to most urban and recreational uses. The wetness and the slow rate of surface runoff are severe limitations on sites for urban and recreational uses. Extensive drainage measures may be needed to control surface and subsurface water.

The Rains soil is in capability subclass IIIw. The Urban land is in capability subclass VIIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol in areas of the Rains soil is 10W. The Urban land has not been assigned a woodland ordination symbol.

Ro—Roanoke loam, occasionally flooded. This map unit consists mainly of nearly level, very deep, poorly drained Roanoke and similar soils on low flats and in depressions or drainageways along the Cape Fear River and its major tributaries. Mapped areas are long and narrow and range from about 5 to more than 50 acres in size.

Typically, the surface layer is grayish brown loam 7 inches thick. The subsoil is 39 inches thick. The upper part is grayish brown loam. The next part is grayish brown clay loam. The lower part is light gray clay loam. The underlying material to a depth of 60 inches is light gray loamy sand.

Permeability is slow. Available water capacity is moderate. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at or near the surface from November through May during most years. Surface runoff is slow, which results in ponding in some areas during wet periods. This map unit is occasionally flooded for brief periods during November through June.

Included in mapping are Wahee, Altavista, and Augusta soils. Wahee soils are somewhat poorly drained, and Altavista soils are moderately well drained. These soils are at the higher elevations. Augusta soils are intermingled with areas of the Roanoke soil and are somewhat poorly drained. Included soils make up about 20 percent of the map unit.

Most of this map unit is used as woodland. The remaining acreage is used for row crops or pasture.

This map unit is moderately suited to the cultivated crops grown in the area, such as corn and soybeans. The wetness and the flooding are the main management concerns. A drainage system that includes open ditches helps to lower the water table and to drain surface water more rapidly. Suitable outlets are not available in some areas. Even where the soils are drained, tillage can be delayed in spring because of the wetness. If the soil is plowed when wet, the surface layer can form large clods that are hard and brittle after drying.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is poorly suited to woodland. These soils have a moderately high potential productivity for woodland. The wetness and the flooding, however, can restrict the use of equipment and damage seedlings. The dominant trees are loblolly pine, sweetgum, swamp chestnut oak, water oak, and maple. The understory species include ironwood, sourwood, eastern cottonwood, and hawthorn.

This map unit is poorly suited to most urban and recreational uses. The wetness, the flooding, and the high content of clay are the main limitations.

The capability subclass is IIIw in drained areas and IVw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

StA—State fine sandy loam, 0 to 3 percent slopes, rarely flooded. This map unit consists mainly of nearly level, very deep, well drained State and similar soils on low stream terraces along the Cape Fear, Lower Little, and Upper Little Rivers. Mapped areas are long and narrow and range from about 10 to 50 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 7 inches thick. The subsoil is 33 inches thick. The upper part is light yellowish brown fine sandy loam. The next part is yellowish brown and brownish yellow clay loam. The lower part is brownish yellow sandy loam. The underlying material to a depth of 60 inches is yellowish brown and reddish yellow loamy sand.

Permeability is moderate. Available water capacity also is moderate. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at a depth of 4 to 6 feet from December through June during most years or after periods of heavy rainfall. Most areas are subject to rare flooding for brief periods from December through June.

Included in mapping are small areas of Wickham and Altavista soils. Wickham soils have a redder subsoil than that of the State soil. They are intermingled with areas of the State soil. Altavista soils are moderately well drained. They are in depressions or along drainageways that have a slope of more than 2 percent. Included soils make up about 20 percent of the map unit.

Most of this map unit is used for cultivated crops or pasture. The remaining acreage is mostly woodland.

This map unit is well suited to the cultivated crops grown in the area, such as corn, soybeans, tobacco, and small grain. Conservation tillage, winter cover crops, stripcropping, field borders, contour farming, and crop residue management reduce the rate of surface runoff and help to maintain tilth.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. The dominant trees are loblolly pine, red maple, hickory, yellow-poplar, black tupelo, American elm, American beech, southern red oak, water oak, and white oak. The understory species include dogwood, sassafras, sourwood, and waxmyrtle. No major limitations affect timber production.

This map unit is poorly suited to most urban and recreational uses. The flooding and the wetness are the main management concerns.

The capability class is I. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

To—Toisnot loam. This map unit consists mainly of nearly level, very deep, poorly drained Toisnot and similar soils in shallow depressions, at the head of drainageways, and along the outer edges of stream terraces adjacent to the better drained areas in the uplands. Mapped areas are elongated and range from about 3 to 20 acres in size.

Typically, the surface layer is black loam 8 inches thick. The subsurface layer is gray loamy sand 10 inches thick. The subsoil extends to a depth of 38 inches. The upper part is light brownish gray sandy loam. The next part is light gray, very firm and brittle loamy sand. The lower part is light gray, very firm and brittle sandy loam.

Permeability is slow. Available water capacity is moderate. Reaction is extremely acid to strongly acid, except where the surface layer has been limed. The seasonal high water table is at 0.5 foot above the surface to 1.0 foot below from December through April during most years or after periods of heavy rainfall.

Included in mapping are small areas of a similar soil that is very poorly drained. Also included are small areas of Bibb and Rains soils. These soils do not have a very firm, brittle subsoil and are intermingled with areas of the Toisnot soil. Included soils make up about 15 percent of the map unit.

Most of this map unit is native forest. Some areas are used as cropland or pasture.

If this map unit is properly drained, it is moderately suited to the cultivated crops commonly grown in the area. Corn, soybeans, and small grain are the main crops. A drainage system that includes open ditches and tile improves surface drainage. Such a system is very difficult to install because of the firmness of the hardpan and because ditchbanks cave as water dissolves the hardpan. Land grading improves surface drainage by eliminating depressions (fig. 8). If a drainage system is installed, this soil can produce high yields.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is poorly suited to woodland. These soils have moderate productivity for species that can tolerate long periods of wetness. The major canopy trees are sweetgum, yellow-poplar, and loblolly pine. The important understory species are redbay, sweetbay, American holly, switchcane, and greenbrier. Wooded areas are important as habitat for fox, rabbit, opossum, birds, and other wildlife. The wetness may restrict the use of equipment and damage seedlings.

This map unit is poorly suited to most urban and recreational uses. The wetness and the restricted permeability are the main limitations.

The capability subclass is IVw in drained areas and Vw in undrained areas. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7W.

VaB—Vaucluse loamy sand, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Vaucluse and similar soils on the slightly rounded parts of ridges and on side slopes. It is mainly in the western part of the county, south of the Upper Little River. Mapped areas are long and narrow or irregular in shape and range from about 5 to 15 acres in size.

Typically, the surface layer is dark brown loamy sand 3 inches thick. The subsoil is 41 inches thick and is very firm and brittle. It is strong brown sandy loam in the upper part, yellowish red sandy clay loam in the next part, and yellowish red and strong brown sandy loam in the lower part. The underlying material to a depth of 60 inches is very firm, brittle, brownish yellow, stratified sand and loamy sand.

Permeability is moderately slow or slow. Available water capacity is low. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

Included in mapping are small areas of Blaney and Gilead soils. These soils are intermingled with areas of the Vaucluse soil. Blaney soils have more sand in the surface layer than the Vaucluse soil. Gilead soils are clayey and moderately well drained. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as woodland. Some areas are used as cropland or pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. It is seldom cultivated, however, because of the hazard of erosion and the relatively small size of the individual areas.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Longleaf pine, loblolly pine, and a variety of oaks are the dominant tree species. The main understory species include blackjack oak, post oak, black oak, and blackgum. No major limitations affect timber production. Droughtiness is a limitation affecting seedling mortality.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability may limit

Figure 8.—A ponded area of Toisnot loam. A drainage system or land shaping would provide safe disposal of the surface water and minimize the ponding.

the use of septic tank absorption fields. Silt fences and sedimentation basins can help to control runoff and erosion on construction sites.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

VaD—Vaucluse loamy sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Vaucluse and similar soils on side slopes. It is mainly in the western part of the county, south of the Upper Little River. Mapped areas are long and narrow and range from about 5 to 15 acres in size.

Typically, the surface layer is dark brown loamy sand 3 inches thick. The subsoil is 41 inches thick and is very firm and brittle. It is strong brown sandy loam in the upper part, yellowish red sandy clay loam in the next part, and yellowish red and strong brown sandy loam in the lower part. The underlying material to a

depth of 60 inches is very firm, brittle, brownish yellow, stratified sand and loamy sand.

Permeability is moderately slow or slow. Available water capacity is low. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

Included in mapping are small areas of Blaney and Gilead soils. These soils are intermingled with areas of the Vaucluse soil. Blaney soils have more sand in the surface layer than the Vaucluse soil. Gilead soils are clayey and are moderately well drained. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as woodland. Some areas are used as cropland or pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. It is seldom cultivated, however, because of the severe hazard of erosion and the relatively small size of the individual areas.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Longleaf pine, loblolly pine, and a variety of scrub oaks are the dominant tree species. The main understory species include blackjack oak, post oak, black oak, and blackgum. No major limitations affect timber production. Droughtiness is a limitation affecting seedling mortality.

This map unit is moderately suited to most urban and recreational uses. The slope may be a limitation on sites for buildings, and the restricted permeability may limit the use of septic tank absorption fields. Silt fences and sedimentation basins can help to control runoff and erosion on construction sites.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

VeB—Vaucluse gravelly loamy sand, 2 to 8 percent slopes. This map unit consists mainly of gently sloping, very deep, well drained Vaucluse and similar soils on the slightly rounded parts of ridges and on side slopes. It is mainly in the western part of the county, south of the Upper Little River. Mapped areas are long and narrow or irregular in shape and range from about 5 to 15 acres in size.

Typically, the surface layer is dark grayish brown and light yellowish brown gravelly loamy sand 14 inches thick. The subsoil is 30 inches thick and is very firm and brittle. It is strong brown sandy loam in the upper part, yellowish red sandy clay loam in the next part, and yellowish red and strong brown sandy loam in the lower part. The underlying material to a depth of 60 inches is very firm, brittle, brownish yellow, stratified sand and loamy sand.

Permeability is moderately slow or slow. Available water capacity is low. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

Included in mapping are small areas of Lillington, Blaney, and Gilead soils. These soils are intermingled with areas of the Vaucluse soil. Lillington soils have a higher content of coarse fragments than the Vaucluse soil, and Blaney soils have more sand in the surface layer. Gilead soils are clayey and are moderately well drained. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as woodland. Some areas are used as cropland or pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. It is seldom cultivated, however, because of the severe hazard of erosion and the relatively small size of the individual areas. The gravel in the surface layer may restrict some tillage implements.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Longleaf pine, loblolly pine, and a variety of oaks are the dominant tree species. The main understory species include blackjack oak, post oak, black oak, and blackgum. No major limitations affect timber production. Droughtiness is a limitation affecting seedling mortality.

This map unit is moderately suited to most urban and recreational uses. The restricted permeability may limit the use of septic tank absorption fields. Silt fences and sedimentation basins can help to control runoff and erosion on construction sites.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

VeD—Vaucluse gravelly loamy sand, 8 to 15 percent slopes. This map unit consists mainly of strongly sloping, very deep, well drained Vaucluse and similar soils on side slopes. It is mainly in the western part of the county, south of the Upper Little River. Mapped areas are long and narrow or irregular in shape and range from about 5 to 15 acres in size.

Typically, the surface layer is dark grayish brown and light yellowish brown gravelly loamy sand 14 inches thick. The subsoil is 30 inches thick and is very firm and brittle. It is strong brown sandy loam in the upper part, yellowish red sandy clay loam in the next part, and yellowish red and strong brown sandy loam in the lower

part. The underlying material to a depth of 60 inches is very firm, brittle, brownish yellow, stratified sand and loamy sand.

Permeability is moderately slow or slow. Available water capacity is low. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

Included in mapping are small areas of Lillington, Blaney, and Gilead soils. These soils are intermingled with areas of the Vaucluse soil. Lillington soils have a higher content of coarse fragments than the Vaucluse soil, and Blaney soils have more sand in the surface layer. Gilead soils are clayey and are moderately well drained. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as woodland. Some areas are used as cropland or pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. It is seldom cultivated, however, because of the severe hazard of erosion and the relatively small size of the individual areas. The gravel in the surface layer may restrict some tillage implements.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Longleaf pine, loblolly pine, and a variety of scrub oaks are the dominant tree species. The main understory species include blackjack oak, post oak, black oak, and blackgum. No major limitations affect timber production. Droughtiness is a limitation affecting seedling mortality.

This map unit is moderately suited to most urban and recreational uses. The slope may be a limitation on sites for buildings and the restricted permeability may limit the use of septic tank absorption fields. Silt fences and sedimentation basins can help to control runoff and erosion on construction sites.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

VeE—Vaucluse gravelly loamy sand, 15 to 25 percent slopes. This map unit consists mainly of moderately steep, very deep, well drained Vaucluse and similar soils on side slopes. It is mainly in the western part of the county, south of the Upper Little River. Mapped areas are long and narrow or irregular in shape and range from about 5 to 15 acres in size.

Typically, the surface layer is dark grayish brown and light yellowish brown gravelly loamy sand 14 inches thick. The subsoil is 30 inches thick and is very firm and brittle. It is strong brown sandy loam in the upper part, yellowish red sandy clay loam in the next part, and yellowish red and strong brown sandy loam in the lower part. The underlying material to a depth of 60 inches is very firm, brittle, brownish yellow, stratified sand and loamy sand.

Permeability is moderately slow or slow. Available water capacity is low. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

Included in mapping are small areas of Lillington, Blaney, and Gilead soils. These soils are intermingled with areas of the Vaucluse soil. Lillington soils have a higher content of coarse fragments than the Vaucluse soil, and Blaney soils have more sand in the surface layer. Gilead soils are clayey and are moderately well drained. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as woodland. Some areas are used for pasture.

This map unit is poorly suited to the cultivated crops commonly grown in the area. The slope is a severe limitation affecting the use of equipment.

This map unit is moderately suited to hay and pasture. The slope is a limitation affecting the use of some equipment. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. Longleaf pine, loblolly pine, and a variety of scrub oaks are the dominant tree species. The main understory species include blackjack oak, post oak, black oak, and blackgum. The use of equipment may be limited because of the slope. Droughtiness is a limitation affecting seedling mortality.

This map unit is poorly suited to most urban and recreational uses. The slope is the main limitation on sites for buildings, and the restricted permeability may limit the use of septic tank absorption fields. Silt fences and sedimentation basins can help to control runoff and erosion on construction sites.

The capability subclass is VIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 7A.

WaB—Wagram loamy sand, 0 to 6 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, well drained Wagram and similar soils on broad ridges in the uplands. It is in the eastern part of the county, north of the Cape Fear River. Mapped areas are irregular in shape and range from about 7 to 50 acres in size.

Typically, the surface layer is brown loamy sand 10

inches thick. The subsurface layer is very pale brown loamy sand 19 inches thick. The upper part of the subsoil is brownish yellow sandy loam and sandy clay loam. The next part is strong brown sandy clay loam. The next part is mottled brown, light gray, and red sandy clay loam. The lower part to a depth of 80 inches is brownish yellow and light gray sandy loam.

Permeability is moderate. Available water capacity is low or moderate. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

Included in mapping are small areas of Norfolk, Orangeburg, Candor, and Fuquay soils. Norfolk and Orangeburg soils have less sand in the surface layer than the Wagram soil and are in the more sloping areas. Candor and Fuquay soils are intermingled with areas of the Wagram soil. Candor soils are excessively drained. Fuquay soils have plinthite in the subsoil. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as cropland. A few areas are used as woodland or pasture.

This map unit is well suited to the cultivated crops commonly grown in the area. Corn, soybeans, tobacco, small grain, and sweet potatoes are the main crops. Droughtiness is the main limitation. Conservation tillage and crop residue management conserve water and help to control soil blowing.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This map unit is moderately suited to woodland. Loblolly pine, longleaf pine, a variety of oaks, and hickory are the dominant canopy trees. The understory species include dogwood, American holly, black cherry, and scrub oaks. The sandy surface layer can increase the seedling mortality rate and limit the use of some equipment.

This map unit is well suited to most urban and recreational uses. Seepage is a severe limitation on sites for sewage lagoons and landfills. The sandy surface layer is a moderate limitation affecting most recreational uses.

The capability subclass is IIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

WaC—Wagram loamy sand, 6 to 10 percent slopes. This map unit consists mainly of gently sloping to strongly sloping, very deep, well drained Wagram and similar soils on broad ridges in the uplands. It is in the eastern part of the county, north of the Cape Fear River. Mapped areas are long and narrow and range from about 5 to 20 acres in size.

Typically, the surface layer is brown loamy sand 10 inches thick. The subsurface layer is very pale brown loamy sand 19 inches thick. The upper part of the subsoil is brownish yellow sandy loam and sandy clay loam. The next part is strong brown sandy clay loam. The next part is mottled brown, light gray, and red sandy clay loam. The lower part to a depth of 80 inches is brownish yellow and light gray sandy loam.

Permeability is moderate. Available water capacity is low or moderate. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

Included in mapping are small areas of Norfolk, Orangeburg, Candor, Blaney, and Fuquay soils. Norfolk and Orangeburg soils have less sand in the surface layer than the Wagram soil and are in the more sloping areas. Candor, Blaney, and Fuquay soils are intermingled with areas of the Wagram soil. Candor soils are excessively drained, Blaney soils have a plastic subsoil, and Fuquay soils have plinthite in the subsoil. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as cropland. Many areas are used as woodland. A few areas are used for pasture.

This map unit is moderately suited to the cultivated crops commonly grown in the area. Corn, soybeans, tobacco, small grain, and sweet potatoes are the main crops. Droughtiness is the main limitation. Conservation tillage and crop residue management conserve water and help to control soil blowing.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This map unit is moderately suited to woodland. Loblolly pine, longleaf pine, a variety of oaks, and hickory are the dominant canopy trees. The understory species include dogwood, American holly, black cherry, and oak. The sandy surface layer can increase the seedling mortality rate and limit the use of some equipment.

This map unit is moderately suited to most urban and recreational uses. Seepage is a severe limitation on sites for sewage lagoons and landfills. The sandy surface layer is a moderate limitation affecting most recreational uses. The slope is a limitation affecting some uses.

The capability subclass is IIIs. Based on loblolly pine as the indicator species, the woodland ordination symbol is 8S.

We—Wahee fine sandy loam, occasionally flooded. This map unit consists mainly of nearly level, very deep, somewhat poorly drained Wahee and similar soils on low stream terraces along the Cape Fear, Lower Little, and Upper Little Rivers. Mapped areas are long and narrow or irregular in shape and range from about 5 to 60 acres in size.

Typically, the surface layer is grayish brown fine sandy loam 8 inches thick. The subsurface layer is pale brown fine sandy loam 2 inches thick. The subsoil extends to a depth of 45 inches. The upper part is yellowish brown and light gray clay, and the lower part is light gray sandy clay loam. The upper part of the underlying material is light gray sandy clay loam. The lower part to a depth of 62 inches is light gray, stratified sand.

Permeability is slow. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid in the surface layer, except where limed, and from extremely acid to strongly acid in the subsoil and underlying material. The seasonal high water table is at a depth of 0.5 foot to 1.5 feet from December through March during most years or after periods of heavy rainfall. This soil is occasionally flooded for brief periods from December through April.

Included in mapping are small areas of Augusta, Roanoke, and Altavista soils. Augusta soils have less clay than the Wahee soil, and Roanoke soils are poorly drained. These included soils are in depressions. Altavista soils are moderately well drained. They are on the slightly higher ridges. Included soils make up about 20 percent of the map unit.

Most of this map unit is native forest. Some areas have been intensively drained and are used as cropland or pasture.

This map unit is moderately suited to the cultivated crops grown in the area. Corn, soybeans, and small grain are the main crops. A drainage system that includes open ditches, tile, and land grading improves the productivity of these soils. If such a system is installed, this soil can produce high yields.

This map unit is moderately suited to hay and pasture. If surface water is drained, the areas that otherwise would be wetter also produce good stands of pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is moderately suited to woodland. The major canopy trees are sweetgum, loblolly pine, and pin oak. The important understory species are switchcane and greenbrier. These soils have a high potential productivity for woodland; however, the wetness and the flooding can restrict the use of equipment and damage seedlings. Wooded areas are important as habitat for raccoon, deer, fox, rabbit, opossum, birds, and other wildlife.

This map unit is poorly suited to most urban and recreational uses. It generally is not used as a site for urban or recreational development because of the wetness and the flooding.

The capability subclass is IIw. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9W.

WfB—Wakulla sand, 0 to 8 percent slopes. This map unit consists mainly of nearly level and gently sloping, very deep, somewhat excessively drained Wakulla and similar soils. It is on broad, sandhill ridges in the uplands. It is in the western part of the county, south of the Upper Little River, and on stream terraces along the Upper Little and Lower Little Rivers. Mapped areas are irregular in shape and range from about 10 to more than 150 acres in size.

Typically, the surface layer is brown and brownish yellow sand 11 inches thick. The subsoil to a depth of 36 inches is yellowish brown loamy sand. The underlying material to a depth of 90 inches is brownish yellow or reddish yellow sand.

Permeability is rapid. Available water capacity is very low. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed.

Included in mapping are small areas that have a surface layer of loamy sand, small intermingled areas of Lakeland and Pocalla soils on the sandhill ridges, and small intermingled areas of Wickham and State soils on terraces. Lakeland soils do not have thin layers of loamy material in the subsoil. Pocalla soils are somewhat excessively drained. Wickham and State soils have more clay than the Wakulla soil and are well drained. Also included on terraces are small areas of soils similar to the Wakulla soil but having significant amounts of gravel on the surface or in the subsoil and areas where the seasonal high water table is at a depth of less than 6 feet. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as woodland. The remaining acreage is used as cropland or pasture.

This map unit is poorly suited to cultivated crops, such as corn and soybeans. Droughtiness, leaching of plant nutrients, and soil blowing are the major limitations. Conservation tillage and close-growing cover crops help to control soil blowing and reduce leaching. In the steeper areas, erosion is a moderate hazard if this unit is cultivated.

This map unit is moderately suited to hay and pasture. It is best suited to coastal bermudagrass. It is not suited to most other forage crops grown in the

county because of the droughtiness. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition.

This map unit is moderately suited to woodland. Longleaf pine and loblolly pine are the major overstory species. A variety of oaks also grow in areas of this unit, but they seldom reach harvestable size. The main understory species include turkey oak, post oak, water oak, waxmyrtle, southern red oak, sweetgum, and sassafras. Droughtiness is a limitation affecting seedling mortality.

This map unit is moderately suited to most urban and recreational uses. The major limitations include excess seepage, which affects sites for septic tank absorption fields, and the droughtiness. Seepage is also a severe limitation on sites for sewage lagoons and landfills. The high content of sand is a severe limitation on sites for recreational uses.

The capability subclass is IIIs. Based on longleaf pine as the indicator species, the woodland ordination symbol is 5S.

Wh—Wehadkee loam, frequently flooded. This map unit consists mainly of nearly level, very deep, poorly drained Wehadkee and similar soils on flood plains along the Cape Fear River, the Upper Little River, and their tributaries. Mapped areas are long and narrow and range from about 5 to 100 acres in size.

Typically, the surface layer is brown loam 6 inches thick. The subsoil is 34 inches thick. The upper part is gray silt loam. The next part is light gray silt loam that has yellowish brown mottles. The lower part is gray silty clay loam that has yellowish brown mottles. The underlying material to a depth of 80 inches is yellow fine sandy loam that has pale brown and light gray mottles or is light gray fine sand.

Permeability is moderate. Available water capacity is high. Reaction ranges from very strongly acid to slightly acid, except where the surface layer has been limed. The seasonal high water table is at or near the surface from November through May during most years or after periods of heavy rainfall. These soils are frequently flooded for brief periods from November through June.

Included in mapping are small areas of Chewacla, Roanoke, and Congaree soils. Chewacla and Roanoke soils are intermingled with areas of the Wehadkee soil. Chewacla soils are somewhat poorly drained. Roanoke soils are clayey. Congaree soils are moderately well drained. They are adjacent to streambanks. Included soils make up about 15 percent of the map unit.

Most of this map unit is native forest. A few areas are used as cropland or pasture.

This map unit is poorly suited to cultivated crops. The wetness and the flooding are the major management concerns. If this unit is intensively drained and protected from flooding during the growing season, it is capable of producing moderately high yields of corn, soybeans, and small grain.

This map unit is moderately suited to hay and pasture. The wetness and the flooding are the main management concerns. If this unit is adequately drained, it can produce high-quality forage.

This map unit is poorly suited to woodland. It has a high potential productivity. The wetness and the flooding, however, can restrict the use of equipment and damage seedlings. The major canopy trees are sweetgum, yellow-poplar, water oak, and loblolly pine. The important understory species are American holly, greenbrier, switchcane, and cinnamon fern. Wetland areas are important as habitat for deer, raccoon, fox, rabbit, bobcat, opossum, birds, and other wildlife.

This map unit is poorly suited to most urban and recreational uses. It is not generally used as a site for urban or recreational development because of the wetness and the flooding.

The capability subclass is VIw. Based on yellow-poplar as the indicator species, the woodland ordination symbol is 8W.

WkB—Wickham fine sandy loam, 0 to 6 percent slopes, rarely flooded. This map unit consists mainly of nearly level and gently sloping, very deep, well drained Wickham and similar soils on terraces along the Upper Little, Lower Little, and Cape Fear Rivers. Mapped areas are irregular in shape and range from about 5 to 50 acres in size.

Typically, the surface layer is brown fine sandy loam 4 inches thick. The subsoil extends to a depth of 49 inches. The upper part is yellowish red sandy clay loam and fine sandy loam. The lower part is strong brown gravelly fine sandy loam. The upper part of the underlying material is reddish yellow fine sandy loam. The lower part to a depth of 72 inches is yellowish red and reddish yellow sand.

Permeability is moderate. Available water capacity also is moderate. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed. This unit is subject to rare flooding for brief periods.

Included in mapping are small areas of State, Altavista, and Augusta soils. State soils have a browner subsoil than that of the Wickham soil and are in level to slightly concave areas. Altavista soils are moderately well drained, and Augusta soils are somewhat poorly drained. These soils are in depressions and small drainageways. Also included are small areas of soils that have a sandy surface layer that is more than 20

inches thick. Included soils make up about 25 percent of the map unit.

Most of this map unit is used for cultivated crops. The remaining acreage is used as pasture or woodland.

This map unit is well suited to the cultivated crops commonly grown in the area. Corn, soybeans, and small grain are the major crops. Erosion is a moderate hazard. Terraces, field borders, grassed waterways, conservation tillage, and crop residue management can help to control erosion.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, sweetgum, a variety of oaks, and hickory are the major canopy trees. The understory species include dogwood, American holly, black cherry, and red maple. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The flooding is the main hazard.

The capability subclass is IIe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

WkD—Wickham fine sandy loam, 6 to 15 percent slopes, rarely flooded. This map unit consists mainly of strongly sloping, very deep, well drained Wickham and similar soils on terrace side slopes along the Upper Little, Lower Little, and Cape Fear Rivers. Mapped areas are irregular in shape and range from about 10 to 50 acres in size.

Typically, the surface layer is brown fine sandy loam 4 inches thick. The subsoil extends to a depth of 49 inches. It is yellowish red sandy clay loam and fine sandy loam in the upper part, strong brown gravelly fine sandy loam in the next part, and reddish yellow fine sandy loam in the lower part. The underlying material to a depth of 72 inches is yellowish red and reddish yellow sand.

Permeability is moderate. Available water capacity also is moderate. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed. This unit is subject to rare flooding for brief periods.

Included in mapping are small areas of State soils, which have a browner subsoil than that of the Wickham soil and are in the slightly concave areas. Also included are small areas of soils that have a sandy surface layer that is more than 20 inches thick. Included soils make up about 25 percent of the map unit.

Most of this map unit is used as pasture or woodland. A few areas are used for cultivated crops.

This map unit is moderately suited to the cultivated crops commonly grown in the area. Corn, soybeans, and small grain are the major crops. Erosion is a severe hazard. Terraces, field borders, grassed waterways, conservation tillage, and crop residue management can help to control erosion.

This map unit is well suited to hay and pasture. Proper stocking rates, pasture rotation, timely deferment of grazing, and restricted use during wet periods help to keep the pasture in good condition.

This map unit is well suited to woodland. Loblolly pine, sweetgum, a variety of oaks, and hickory are the major canopy trees. The understory species include dogwood, American holly, black cherry, and red maple. No major limitations affect timber production.

This map unit is moderately suited to most urban and recreational uses. The flooding and the slope are the main management concerns.

The capability subclass is IVe. Based on loblolly pine as the indicator species, the woodland ordination symbol is 9A.

Prime Farmland

In this section, prime farmland is defined and the soils in Harnett County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 8 percent.

The following map units are considered prime farmland in Harnett County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Some soils that have a high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. If applicable, the need for these measures is indicated in parentheses after the map unit name in the following list. Onsite evaluation is necessary to determine whether or not limitations have been overcome by corrective measures.

The soils identified as prime farmland in Harnett County are:

AtA	Altavista fine sandy loam, 0 to 3 percent slopes, rarely flooded
Au	Augusta fine sandy loam, rarely flooded (where drained)
AyA	Aycock silt loam, 0 to 2 percent slopes
AyB	Aycock silt loam, 2 to 6 percent slopes
CeB	Cecil fine sandy loam, 2 to 8 percent slopes
Ch	Chewacla and Congaree loams, frequently flooded (where drained and protected from flooding or not frequently flooded during the growing season)
DoA	Dothan loamy sand, 0 to 2 percent slopes
DoB	Dothan loamy sand, 2 to 6 percent slopes
DtB	Dothan gravelly loamy sand, 0 to 6 percent slopes
EnB	Enon fine sandy loam, 2 to 8 percent slopes
ExA	Exum very fine sandy loam, 0 to 2 percent slopes
GaA	Gilead loamy sand, 0 to 2 percent slopes

GoA	Goldsboro loamy sand, 0 to 2 percent slopes
Gr	Grantham loam
HaB	Helena fine sandy loam, 2 to 8 percent slopes
Ly	Lynchburg sandy loam (where drained)
MaA	Marlboro sandy loam, 0 to 2 percent slopes
MaB	Marlboro sandy loam, 2 to 6 percent slopes
Na	Nahunta loam (where drained)
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 6 percent slopes
NoC	Norfolk loamy sand, 6 to 10 percent slopes
OrB	Orangeburg loamy sand, 2 to 6 percent slopes
Ps	Portsmouth loam, rarely flooded (where drained)
Ra	Rains fine sandy loam (where drained)
StA	State fine sandy loam, 0 to 3 percent slopes, rarely flooded
WkB	Wickham fine sandy loam, 0 to 6 percent slopes, rarely flooded

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help to prevent construction failures caused by unfavorable soil properties.

Generally, the soils in Harnett County that are well suited to crops also are well suited to urban uses. The data concerning specific soils in the county can be used in planning future land use patterns. The potential for farming should be considered relative to any soil limitations and the potential for nonfarm development.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Parks Blake, district conservationist, and Foy D. Hendrick, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units" and in the tables. Specific information can be obtained from the local office of the Soil Conservation Service or the North Carolina Cooperative Extension Service.

In 1987, approximately 79,292 acres in Harnett County was cropland and 20,873 acres was pasture. About 24,080 acres was used for soybeans; 10,090 acres for corn; 7,696 acres for tobacco; 1,833 acres for sweet potatoes; 1,897 acres for cotton; and 3,317 acres for hay *(14)*.

A large percentage of the acreage planted to small grain is double cropped with soybeans. A small acreage is used for truck crops, such as cucumbers, Irish potatoes, strawberries, and watermelons. Pasture and hayland are planted to coastal bermudagrass and tall fescue. Coastal bermudagrass is planted in areas of the sandy soils, such as Blaney, Candor, Fuquay, Lakeland, and Wakulla soils. Tall fescue is planted in areas of the loamy and clayey soils, such as Aycock, Cecil, Marlboro, and Norfolk soils. Both grasses are planted in areas of wet soils, such as Rains, Coxville, and Bibb soils.

About 26,434 acres, or 7 percent of Harnett County, has no major conservation problems if used for cultivated crops or pasture. This acreage consists of soils that generally have slopes of less than 2 percent. These soils include Dothan, Marlboro, and Norfolk soils on uplands and State soils on terraces. If properly

managed, including applications of fertilizer and crop residue management, these soils can sustain long-term high yields.

Erosion is a management concern on about 40 percent (154,000 acres) of the cropland and pasture in the county. It is more serious in areas that have a slope of more than 2 percent, including some areas of Cecil, Dothan, Gilead, Marlboro, Nason, Norfolk, Orangeburg, and Pacolet soils.

Erosion is costly for various reasons. Productivity decreases and tilth deteriorates as the surface layer is washed away. Costly herbicides, fertilizers, and lime are carried out of the field along with valuable topsoil and organic matter. Social and environmental costs increase if the eroded materials are deposited into streams, lakes, and reservoirs. Effective control of erosion increases agricultural productivity and minimizes the public cost of maintaining water quality.

Terraces and diversions help to control erosion by intercepting excess surface runoff and safely routing water to suitable outlets, such as grassed waterways, which are usually planted to tall fescue or lovegrass. Field borders help divert sediment laden runoff around the field. These conservation practices are practical and highly effective on soils that have a uniform slope. Examples are Cecil, Dothan, Gilead, Marlboro, Norfolk, and Orangeburg soils.

Contour tillage and stripcropping are effective conservation practices on many of the soils in the county. These practices are most effective on the more uniform slopes but can be adapted to a wide range of slope patterns. A system of conservation tillage, such as minimum, reduced, or no-till, also is effective in controlling erosion on these sloping soils.

In many areas of the sloping Cecil, Gilead, Nason, Pacolet, and Vaucluse soils, the slope is so short and irregular that contour tillage or parallel terraces are not practical. In these areas the use of no-till farming or an effective conservation cropping system that leaves a substantial plant cover is imperative to control erosion.

Information on the design and applicability of erosion-control measures for each type of soil can be obtained from the local office of the Soil Conservation Service.

Droughtiness is often a problem in soils that have a sandy surface layer, such as Blaney, Candor, Fuquay, Pocalla, and Wagram soils. About 30 percent (35,200 acres) of the cropland and pasture in the county is areas of these soils. The sandy surface layer of these soils has a very low organic matter content, has a low available water capacity, and is rapidly leached of available nutrients. In the county, a large percentage of the tobacco, corn, soybeans, and small grain are grown in areas of these soils. A conservation cropping system that includes conservation tillage and crop residue management and a good system of irrigation management reduce the droughtiness.

A compacted traffic pan may form between the surface layer and subsoil in some soils in the county. A traffic pan reduces infiltration, root penetration, permeability, and the amount of water available to plants. Also, it increases the hazard of erosion on sloping soils. A conservation tillage system that uses rippers, subsoilers, and chisels is effective in reducing the occurrence of a traffic pan in Blaney, Dothan, Fuquay, Norfolk, and Wagram soils. The occurrence and severity of a traffic pan in these soils increase with the number of trips across a field per crop season.

Wind erosion is a problem in areas of the droughty soils that have a sandy surface layer. Many tons of topsoil are lost from these soils each year in the county. Most of the wind erosion occurs on large fields in the northeastern part of the county in areas of Fuquay, Pocalla, Blaney, and Wagram soils. Damage from wind erosion can be greatly reduced by using a conservation cropping system that includes conservation tillage, cover crops, and crop residue management. Small grain used as a windbreak between row crops reduces the damage to young crops.

About 15 percent of the cropland and pasture in the county, or 17,600 acres, has a drainage problem. Augusta, Grantham, Lynchburg, Nahunta, Polawana, Portsmouth, Rains, Roanoke, and Wahee soils require a drainage system. A combination of surface drainage, tile drainage, and land smoothing may be needed to obtain optimum crop production. A wide variety of crops, such as corn, soybeans, small grains, truck crops, and forage, can be grown on these soils. In the sandhills, tobacco is often grown in areas of Gilead soils where hillside springs are a problem. Subsurface tile, surface tile, and surface drains are used to drain these wet areas.

The poorly drained and very poorly drained Roanoke, Polawana, Portsmouth, and Wehadkee soils on stream terraces and flood plains tend to respond very slowly to artificial drainage. Drainage is hindered on the Polawana and Portsmouth soils by layers of sand in the substratum, which cause unstable ditchbanks. Drainage is hindered in Roanoke soils by a tight, clayey subsoil and in areas of Wehadkee soils by frequent flooding. Crop production on these soils is generally not practical because of periodic flooding and an equipment limitation. In the Flatwoods part of the county in areas of Grantham and Nahunta soils, drainage is hindered by a lack of natural outlets and by the moderately slow or slow permeability in the subsoil (fig. 9).

Figure 9.—A drainage ditch under construction in an area of Grantham soils. Inadequate surface drainage is a major limitation in some parts of Harnett County.

Tilth is an important factor affecting crop production. Seed germination and water infiltration are highly influenced by tilth. Soils that have good tilth have a surface layer that is granular and porous.

The surface layer of most of the soils in the county is loamy sand, sandy loam, or fine sandy loam and is low in organic matter content. If not protected by vegetation or mulch, soils that have a surface layer of silt loam are prone to crusting after intense rainfalls. Examples are Aycock, Exum, and Nason soils. Some soils that have a surface layer of very fine sandy loam or are eroded also are prone to crusting. Adding crop residue, manures, and mulches to the soil minimizes crusting by protecting the surface from the impact of raindrops.

Because of crusting during the winter, fall plowing is generally not a good practice on soils that have a surface layer that is very fine sandy loam or silt loam or are eroded. The crust that forms is hard, almost impervious to water, and increases the rate of runoff and erosion during the winter. Many soils that are

Figure 10.—A field of cotton in an area of Norfolk loamy sand, 0 to 2 percent slopes. Aerial application of herbicides or pesticides is common for some crops in Harnett County.

plowed in the fall are nearly as hard and dense at planting time as they were before they were plowed.

Chemical Weed Control

The use of herbicides for weed control is a common practice on the cropland in Harnett County (fig. 10). It decreases the need for tillage and is an integral part of modern farming. Selected soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates of both of these properties were determined for the soils in the county. Table 14 shows a general range of organic matter content in the surface layer of the soils. The texture of the surface layer is shown in the USDA texture column in table 13.

In some areas the organic matter content projected for the different soils is outside the range shown in the table. The content can be higher in soils that have received large amounts of animal or manmade waste. Soils that have recently been brought into cultivation may have a higher content of organic matter in the surface layer than similar soils that have been cultivated for a long time. Conservation tillage can increase the content of organic matter in the surface layer. A lower content of organic matter is common where the surface layer has been partly or completely removed by erosion or land smoothing. Current soil tests should be used for specific organic matter determinations.

Soil Fertility

The soils in Harnett County generally are low in natural fertility. They are naturally acid. Additions of lime and fertilizer are needed for the production of most kinds of crops.

Liming requirements are a major concern on cropland. The acidity level in the soil affects the availability of many nutrients to plants and the activity of beneficial bacteria. Lime also neutralizes exchangeable aluminum in the soil and thus counteracts the adverse effects of high levels of aluminum on many crops. Liming adds calcium (from calcitic lime) or calcium and magnesium (from dolomitic lime) to the soil.

A soil test is a guide to what amount and kind of lime should be used. The desired pH levels may differ, depending on the soil properties and the crop to be grown.

Nitrogen fertilizer is required for most crops. It is generally not required, however, in some rotations of soybeans or for alfalfa that is established. A reliable soil test is not available for predicting nitrogen requirements. Appropriate rates of nitrogen application are described in the section "Yields per Acre."

Soil tests can indicate the need for phosphorus and potassium fertilizer. They are needed because phosphorus and potassium tend to build up in the soil.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

A high level of management includes maintaining proper soil reaction and fertility levels as indicated by standard soil tests. The application rate of nitrogen for corn on soils that have a yield potential of 125 to 150 bushels per acre should be 140 to 160 pounds per acre. If the yield potential for corn is 100 bushels per acre or less, a rate of 100 to 120 pounds of nitrogen per acre should be used. The application of nitrogen in excess of that required for potential yields generally is not recommended. The excess nitrogen fertilizer that is not utilized by a crop is an unnecessary expense and causes a hazard of water pollution. If corn or cotton is grown after the harvest of soybeans, nitrogen rates can be reduced by about 20 to 30 pounds per acre. Because nitrogen can be readily leached from sandy soils, applications may be needed on these soils more than once during the growing season.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the North Carolina Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(9)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The capability classification of each map unit component is given in the section "Detailed Soil Map Units" and in table 5.

Woodland Management and Productivity

Albert Coffey, forester, Soil Conservation Service, helped prepare this section.

Owners of woodland in Harnett County have many objectives. These objectives include producing timber; conserving wildlife, soil, and water; preserving aesthetic quality; and providing opportunities for recreational activities, such as commercial hunting. Public demand for clean water and recreational areas creates pressures and opportunities for owners of woodland.

The landowner interested in timber production is faced with the challenge of producing greater yields from smaller areas. Meeting this challenge requires intensive management and silvicultural practices. Many modern silvicultural techniques resemble those long practiced in agriculture. They include establishing, weeding, and thinning a desirable young stand; propagating the more productive species and genetic varieties; providing short rotations and complete fiber utilization; controlling insects, diseases, and weeds; and improving tree growth by applications of fertilizer and the installation of a drainage system. Even though timber crops require decades to grow, the goal of intensive management is similar to that of intensive agriculture. This goal is to produce the greatest yield of the most valuable crop as quickly as possible (fig. 11).

Commercial forests cover 224,014 acres in Harnett County, or about 58 percent of the land area *(13).*

Figure 11.—Slash pine in an area of Candor sand, 0 to 8 percent slopes. This species is well suited to the climate and soil.

Commercial forest is land that is producing or is capable of producing crops of industrial wood and that has not been withdrawn from timber production. Loblolly pine is the most important timber species in the county because it grows fast, is adapted to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage.

One of the first steps in planning intensive woodland management is to determine the potential productivity of the soil for several alternative tree species. The most productive and valued trees are then selected for each soil type. Site and yield information enables a forest manager to estimate future wood supplies. These estimates are the basis of realistic decisions concerning expenses and profits associated with intensive woodland management, land acquisition, or industrial investments.

The potential productivity of woodland depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to the water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The net effects of the interaction of these soil properties and site characteristics determine the potential site productivity.

Other site factors are also important. The gradient and length of slopes affect water movement and availability. The amount of rainfall and length of growing season also influence site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare per year. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of the slope. The letter *X* indicates that a soil has restrictions because of stones or rocks on the surface. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *T* indicates a soil that has, within the root zone, excessive alkalinity or acidity, sodium salts, or other toxic substances that limit the development of desirable trees. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *S* indicates a dry, sandy soil. The letter *F* indicates a soil that has a large amount of coarse fragments. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, the use of wheeled equipment becomes more difficult. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely

across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of the naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to the seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. The predominant common trees are listed in table 6 in the order of their observed occurrence. Additional species that commonly occur on the soils may be listed in the detailed soil map unit descriptions. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

For soils that are commonly used for timber production, the yield is predicted in cubic feet per acre per year. It is predicted at the point where mean annual increment culminates. The estimates of the productivity of the soils in this survey are based mainly on loblolly pine, yellow-poplar, sweetgum, and longleaf pine *(3, 4, 5, 11).*

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years (50 years in this survey). This index applies to fully stocked, even-aged, unmanaged stands. Productivity of a site can be improved through management practices, such as bedding, ditching, managing water, applying fertilizer, and planting genetically improved species.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation. If hardwoods are desired on a forest site, natural reproduction from seeds and sprouts of acceptable species is effective. Special site preparation my be needed.

Recreation

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John P. Edwards, biologist, Soil Conservation Service, helped prepare this section.

The soils of Harnett County produce a wide variety of plants that provide food, cover, and protection for many species of wildlife. Upland game species, such as squirrel, rabbit, quail, mourning dove, red fox, gray fox, raccoon, and songbirds, are abundant in the county. Furbearers, such as muskrat, mink, and opossum, also are plentiful.

Several species of waterfowl, such as mallards, black ducks, and wood ducks, frequent the Cape Fear, Upper Little, Lower Little, and Black Rivers and their tributaries. Large populations of deer are concentrated in the southwestern part of the county in the vicinity of Overhills and Johnsonville. The deer population has increased in Raven Rock State Park and the surrounding steep and very steep woodlands near the Cape Fear River. Wild turkeys have been sighted in this area.

Harnett County has more than 2,500 farm ponds that are 1 to 5 acres in size. Most of these ponds have been stocked with bass and bluegill. Channel catfish have also been stocked in some ponds. These farm ponds usually need additions of lime and fertilizer for maximum production of fish. The Cape Fear River has been stocked with catfish.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat. The ratings in table 8 are intended to be used as a guide and are not site specific. Onsite investigation is needed for individual management plans.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, lovegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and pokeberry.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwoods and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, white-tailed deer, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be

considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, the shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer, stone content, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. The depth to a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. The depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), the shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established. Soil tests

are essential to determine liming and fertilizer needs. Help in making soil tests or in deciding what soil additive, if any, should be used can be obtained from the office of the Harnett County Soil and Water Conservation District or the local office of the North Carolina Cooperative Extension Service.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfill. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. The animal waste lagoons commonly used in farming operations are not considered in the ratings. They are generally deeper than the lagoons referred to in the table and rely on anaerobic bacteria to decompose waste materials.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope or bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate

may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and the shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* have more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. These soils have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale, siltstone, and weathered granite saprolite, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope,

depth to a water table, rock fragments, depth to bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability in the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area. Ponds that are less than about 2 acres in size are not shown on the soil maps because of the scale of mapping.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, mica, or salts or sodium. The depth to a high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table and permeability in the aquifer. The depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement, permeability, depth to a high water table or depth of standing water if the soil is subject to ponding, slope, susceptibility to flooding, subsidence of organic layers, and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is

affected by the availability of suitable irrigation water, the depth of the root zone, and soil reaction.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed *(12)*. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages, by weight, of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, by volume, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments from 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and

in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated content of clay in each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time. It is the difference between the amount of soil water at field moisture capacity and the amount at wilting point.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep or very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil listed in table 15 is assigned to two hydrologic groups, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary covering of the surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to

5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent*; and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(10)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning a humid climate, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that is in humid climates).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the underlying material within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The location of the typical pedon is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(8)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(10)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alpin Series

The Alpin series consists of excessively drained, very rapidly permeable soils that formed in sandy Coastal

Plain sediments. These soils are on stream terraces. Slopes range from 0 to 6 percent.

Typical pedon of Alpin sand, 0 to 6 percent slopes; about 10.0 miles south of Lillington on U.S. Highway 401, east 0.4 mile on Secondary Road 2027, about 600 feet south of the road, in a wooded area:

A—0 to 5 inches; brown (10YR 5/3) sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear smooth boundary.

E1—5 to 30 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; common fine and medium roots; very strongly acid; abrupt smooth boundary.

E2—30 to 38 inches; brownish yellow (10YR 6/6) fine sand; single grained; loose; few fine roots; many uncoated sand grains; few medium flakes of mica; very strongly acid; gradual wavy boundary.

E/Bw—38 to 80 inches; very pale brown (10YR 7/4) sand; single grained; loose; many uncoated sand grains (E part); lamellae of yellowish brown (10YR 5/8) sandy loam about 2 inches thick (Bw part); common medium flakes of mica; very strongly acid; clear smooth boundary.

C—80 to 86 inches; mottled yellow (10YR 8/6) and white (10YR 8/2) sand; single grained; loose; few fine flakes of mica; very strongly acid.

The solum is 80 inches or more thick. Lamellae are at a depth of 40 to 78 inches. They have a cumulative thickness of 1 to 6 inches. Reaction is very strongly acid to slightly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 6. It is sand, loamy sand, or fine sand.

The E part of the E/Bw horizon has hue of 10YR, value of 7 or 8, and chroma of 3 to 6. The Bw part has hue of 10YR, value of 5 to 7, and chroma of 6 to 8 or hue of 7.5YR, value of 5, and chroma of 6 to 8. It is fine sand, loamy fine sand, loamy sand, or sandy loam. Most of the sand grains in the Bw part are coated and weakly bridged with clay.

The C horizon has hue of 10YR, value of 7 or 8, and chroma of 2 to 4. It is sand, fine sand, or gravelly sand.

Altavista Series

The Altavista series consists of moderately well drained, moderately permeable soils that formed in alluvial sediments. These soils are on stream terraces. Slopes range from 0 to 3 percent.

Typical pedon of Altavista fine sandy loam, 0 to 3 percent slopes, rarely flooded; about 3.4 miles west of Lillington on North Carolina Highway 27, south 1.2 miles on a farm road, 50 feet north of the road, in a stand of pines:

Ap—0 to 8 inches; gray (1 0YR 5/1) fine sandy loam; weak medium subangular blocky structure; very friable; common medium roots; strongly acid; abrupt smooth boundary.

Bt1—8 to 13 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common medium roots; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt2—13 to 24 inches; pale brown (10YR 6/3) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; few medium roots; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Bt3—24 to 35 inches; pale brown (10YR 6/3) sandy clay loam; common medium distinct light gray (10YR 7/1) and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

BC—35 to 46 inches; mottled light gray (10YR 7/1), pale brown (10YR 6/3), and brownish yellow (10YR 6/8) sandy loam; weak medium subangular blocky structure; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—46 to 55 inches; mottled light gray (10YR 7/1), pale brown (10YR 6/3), and brownish yellow (10YR 6/8) loamy sand; massive; very friable; common medium flakes of mica; very strongly acid; gradual wavy boundary.

C2—55 to 60 inches; gray (10YR 7/1) fine sand; common medium distinct brownish yellow (10YR 6/8) mottles; massive; very friable; common medium flakes of mica; very strongly acid.

The solum is 30 to more than 60 inches thick. Reaction is extremely acid to moderately acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 1 to 4 or hue of 2.5Y, value of 4 or 5, and chroma of 2. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is loamy sand, loamy fine sand, or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. It is mottled in shades of yellow, brown, red, or gray. It is sandy clay loam or clay loam.

The Btg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is loam, clay loam, or sandy clay loam.

The BC horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. It is mottled in shades of yellow, brown, red, or gray. It is sandy loam or loamy sand.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. It is dominantly fine sand, sand, loamy sand, or sandy loam and may be stratified with these textures. In some pedons, however, it has coarse sand or gravel.

Augusta Series

The Augusta series consists of somewhat poorly drained, moderately permeable soils that formed in loamy alluvial sediments. These soils are on low stream terraces. Slopes range from 0 to 2 percent.

Typical pedon of Augusta fine sandy loam, rarely flooded; about 2.0 miles southeast of Dunn on U.S. Highway 421, about 300 feet northwest of Mingo Swamp stream, 100 feet southwest on U.S. Highway 421:

A—0 to 4 inches; dark grayish brown (10YR 4/2) fine sandy loam; friable; many small roots; strongly acid; abrupt smooth boundary.

E—4 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; friable; many fine roots; common flakes of mica; strongly acid; abrupt smooth boundary.

BE—8 to 12 inches; brown (10YR 5/3) fine sandy loam; friable; many fine roots; common flakes of mica; very strongly acid; clear smooth boundary.

Bt—12 to 30 inches; yellowish brown (10YR 5/4) sandy clay loam; common coarse distinct light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; many fine roots; few thin patchy clay films on faces of peds; few flakes of mica; very strongly acid; gradual smooth boundary.

Btg—30 to 50 inches; gray (10YR 6/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/4) and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; few thin patchy clay films on faces of peds; few flakes of mica; very strongly acid; gradual smooth boundary.

Cg—50 to 60 inches; light gray (10YR 7/2) loamy sand; massive; very strongly acid.

The solum is 40 to 80 inches thick. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The E horizon has hue of 10YR or 5YR, value of 5 or 6, and chroma of 2 to 4. It is loam, sandy loam, or fine sandy loam.

The BE horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 or 4. It is fine sandy loam or sandy loam. In some pedons it has mottles in shades of yellow or gray.

The Bt horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. It is mottled in shades of brown, yellow, or gray. It is clay loam or sandy clay loam.

The Btg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is mottled in shades of brown, yellow, or gray. It is clay loam or sandy clay loam.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It is sand, loamy sand, or sandy loam. Some pedons may be stratified.

Aycock Series

The Aycock series consists of well drained, moderately permeable and moderately slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 6 percent.

Typical pedon of Aycock silt loam, 0 to 2 percent slopes; about 1.0 mile south of Lillington on U.S. Highway 401, east 0.75 mile on Secondary Road 2019, about 150 feet east of the end of the road, in a stand of pines:

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; friable; many medium and fine roots; slightly acid; abrupt smooth boundary.

E—7 to 10 inches; very pale brown (10YR 7/3) silt loam; weak medium granular structure; friable; many medium and fine roots; slightly acid; abrupt smooth boundary.

Bt1—10 to 22 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; many fine roots; few thin faint clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—22 to 36 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; many fine roots; few thin faint patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt3—36 to 48 inches; mottled strong brown (7.5YR 5/8) and yellowish brown (10YR 5/8) silty clay loam; weak fine subangular blocky structure; friable; few

fine roots; few thin faint patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt4—48 to 64 inches; mottled red (2.5YR 4/8), brownish yellow (10YR 6/6), and light gray (10YR 7/1) silty clay loam; weak coarse subangular blocky structure; firm, slightly sticky and slightly plastic; few thin faint patchy clay films on faces of peds; very strongly acid.

The solum is 60 inches or more thick. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or hue of 2.5Y, value of 4 or 5, and chroma of 2. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 or 4. It is silt loam, very fine sandy loam, or loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It is mottled in shades of brown or red, and gray mottles are common below a depth of about 30 inches. The lower part may be mottled in shades of these colors. Texture is silty clay loam, clay loam, or loam.

The BC horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. It has mottles in shades of brown, red, and gray, or it may be mottled in shades of these colors. It is silty clay loam, clay loam, or loam.

Bibb Series

The Bibb series consists of poorly drained, moderately permeable soils that formed in sandy alluvial sediments. These soils are on flood plains. Slopes range from 0 to 2 percent.

Typical pedon of Bibb loam, frequently flooded; about 4.0 miles south of Angier at the intersection of Secondary Roads 1542 and 1510, about 0.5 mile west on Secondary Road 1510, about 50 feet northeast of a bridge, about 50 feet east of West Buies Creek:

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; many medium and large roots; strongly acid; clear smooth boundary.

Cg1—10 to 24 inches; dark gray (10YR 4/1) sandy loam; weak medium granular structure; friable; common fine and medium roots; strongly acid; clear wavy boundary.

Cg2—24 to 48 inches; gray (10YR 5/1) sandy loam that has pockets of loamy sand; massive; friable; few fine roots; strongly acid; clear wavy boundary.

Cg3—48 to 60 inches; light gray (10YR 7/1) loamy sand that has pockets of sandy loam; single grained; loose; strongly acid.

The loamy underlying material extends to a depth of more than 60 inches and is underlain by stratified sediments. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2. The Cg horizon has hue of 10YR or 2.5Y, value of 3 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 3 to 7. It is sandy loam, fine sandy loam, loam, or silt loam. In most pedons it is thinly stratified. In many pedons it has layers of sand. In some pedons the lower part of the Cg horizon contains gravel.

Blaney Series

The Blaney series consists of well drained, moderately slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 2 to 15 percent.

Typical pedon of Blaney loamy sand, 2 to 8 percent slopes; about 3.2 miles south of Clark's Bridge, about 375 feet east of Secondary Road 1117:

Ap—0 to 9 inches; grayish brown (10YR 5/2) loamy sand; single grained; loose; many fine and medium roots; common fine quartz gravel; strongly acid; abrupt smooth boundary.

E—9 to 22 inches; light yellowish brown (10YR 6/4) loamy sand; single grained; loose; few fine and medium roots; common coarse quartz gravel; strongly acid; clear wavy boundary.

Bt1—22 to 28 inches; very pale brown (10YR 7/4) sandy clay loam; weak medium subangular blocky structure; friable, brittle in 20 percent of the mass; few fine roots; common coarse quartz gravel; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—28 to 33 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct reddish yellow (5YR 6/8) mottles; weak medium subangular blocky structure; friable, brittle in 20 percent of the mass; few fine roots; common coarse quartz gravel; few thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—33 to 46 inches; brownish yellow (10YR 6/6) sandy clay loam; many coarse prominent reddish yellow (5YR 6/8) and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, brittle in 20 percent of the mass; common flakes of mica; about 5 percent coarse quartz gravel; very strongly acid; gradual wavy boundary.

C—46 to 64 inches; reddish yellow (5YR 6/8) sandy clay loam that has pockets of sandy loam and sandy clay; common coarse prominent light gray (10YR 7/1) and very pale brown (10YR 7/4) mottles;

massive; friable; common flakes of mica; about 5 percent fine quartz gravel; very strongly acid.

The solum is 40 to more than 60 inches thick. The content of coarse fragments ranges from 0 to 10 percent. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. The E horizon has hue of 10YR, value of 6, and chroma of 2 to 4 or hue of 2.5Y, value of 6, and chroma of 3 or 4. It is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of yellow, brown, or red. In most pedons it has mottles in shades of gray in the lower part. It is sandy clay loam or sandy loam. In some pedons it is sandy clay in the lower part.

The C horizon has hue of 5YR to 10YR, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of yellow, brown, red, or gray. It is dominantly sandy clay loam, clay loam, or sandy loam and is commonly stratified with sandy or clayey material. In some pedons, however, it is loamy coarse sand.

Candor Series

The Candor series consists of somewhat excessively drained soils that formed in sandy and loamy sediments. These soils are rapidly permeable in the upper part and moderately permeable in the lower part. They are on uplands. Slopes range from 0 to 15 percent.

Typical pedon of Candor sand, 0 to 8 percent slopes; about 1.5 miles south of Lillington on North Carolina Highway 27, about 600 feet west of the road:

A—0 to 3 inches; dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; few fine roots; very strongly acid; abrupt smooth boundary.

E—3 to 25 inches; yellowish brown (10YR 5/4) sand; weak fine granular structure; very friable; few fine roots; strongly acid; abrupt wavy boundary.

Bt—25 to 35 inches; yellowish brown (10YR 6/6) loamy sand; weak fine subangular blocky structure parting to weak fine granular; very friable; very strongly acid; gradual wavy boundary.

E'—35 to 60 inches; yellow (10YR 7/6) sand; single grained; loose; very strongly acid; gradual smooth boundary.

B't1—60 to 70 inches; reddish yellow (7.5YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

B't2—70 to 85 inches; reddish yellow (7.5YR 6/8) sandy clay loam; weak medium subangular blocky structure; friable; common large flakes of mica; very strongly acid.

The solum is more than 60 inches thick. The thickness of the sandy horizons and depth to the B't horizon range from 40 to 80 inches. The content of coarse fragments, which are mostly quartz pebbles or ironstone, ranges from 0 to 5 percent in the A and Bt horizons and is as much as 15 percent in the E' and B't horizons. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 6.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8.

The E' horizon has hue of 10YR, value of 5 to 8, and chroma of 3 to 8. It is sand or loamy sand.

The B't horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8, or it is mottled in shades of yellow, brown, red, or gray. It is sandy loam, sandy clay loam, or sandy clay. In some pedons on smooth to gently undulating interstream divides, it contains as much as 5 percent plinthite between depths of 60 and 80 inches.

The BC and C horizons, if they occur, have hue of 7.5YR or 10YR, value of 6 to 8, and chroma of 4 to 8. They are mottled in shades of yellow, brown, red, gray, or white. In some pedons they have fine or medium bodies of white kaolin and flakes of mica. They are sandy loam, sandy clay loam, clay loam, sandy clay, or clay and may be stratified. In some pedons they are dense and compact.

Cecil Series

The Cecil series consists of well drained, moderately permeable soils that formed in material weathered from acid crystalline rocks. These soils are on uplands. Slopes range from 2 to 15 percent.

Typical pedon of Cecil fine sandy loam, 2 to 8 percent slopes; about 10.7 miles northwest of Lillington on U.S. Highway 421, north 2.6 miles on Secondary Road 1265, about 50 feet east of the road:

A—0 to 2 inches; brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; very friable; many fine to coarse roots; about 10 percent quartz pebbles; strongly acid; clear smooth boundary.

E—2 to 4 inches; reddish yellow (7.5YR 6/6) fine sandy loam; weak fine granular structure; very friable; common fine roots; about 5 percent quartz pebbles; strongly acid; abrupt smooth boundary.

Bt1—4 to 15 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; firm, sticky; common fine roots; many prominent continuous clay films on faces of peds; about 5 percent quartz pebbles; strongly acid; clear wavy boundary.

Bt2—15 to 27 inches; red (2.5YR 4/8) clay; many medium prominent reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky; few fine roots; many prominent continuous clay films on faces of peds; about 5 percent quartz pebbles; strongly acid; clear wavy boundary.

Bt3—27 to 36 inches; red (2.5YR 4/8) clay loam; few medium prominent reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; firm, sticky; common distinct patchy clay films on faces of peds; about 5 percent quartz pebbles; strongly acid; clear wavy boundary.

BC—36 to 55 inches; red (2.5YR 4/6) loam; weak medium subangular blocky structure; friable; few fine flakes of mica; about 5 percent quartz pebbles; strongly acid; gradual smooth boundary.

C—55 to 68 inches; multicolored yellow, red, and gray loam consisting of saprolite weathered from micaceous schist; massive; friable; about 5 percent quartz pebbles; strongly acid.

The solum is 40 to more than 60 inches thick. The content of coarse fragments, which are mostly quartz pebbles, ranges from 0 to 15 percent. The content of flakes of mica ranges from 0 to 20 percent in the B and C horizons. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8. The E horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is clay loam or clay and contains less than 30 percent silt.

The BC horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8. In some pedons it has mottles in shades of yellow or brown. It is loam, sandy clay loam, or clay loam.

The C horizon has hue of 10R to 5YR, value of 4 to 6, and chroma of 4 to 8 or is multicolored. It is loam, sandy loam, or sandy clay loam consisting of saprolite weathered from felsic crystalline rock.

Chewacla Series

The Chewacla series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in loamy alluvial sediments derived from residuum of acid crystalline rocks. Slopes range from 0 to 2 percent.

Typical pedon of Chewacla loam, in an area of Chewacla and Congaree loams, frequently flooded; about 4.7 miles north of Lillington on U.S. Highway 401, west 0.4 mile on Secondary Road 1412, southwest 0.7 mile on Secondary Road 1431, southwest 0.8 mile on a farm road past a small pond, 20 feet east of the road:

Ap—0 to 7 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; friable; many fine and medium roots; neutral; clear smooth boundary.

AB—7 to 13 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct very pale brown (10YR 7/3) mottles; weak fine granular structure; friable; few fine flakes of mica; few fine roots; slightly acid; gradual wavy boundary.

Bw1—13 to 24 inches; mottled light gray (10YR 7/2), dark grayish brown (10YR 4/2), yellowish brown (10YR 5/4), and brownish yellow (10YR 6/8) loam; weak medium subangular blocky structure; friable; few fine flakes of mica; slightly acid; gradual wavy boundary.

Bw2—24 to 38 inches; light gray (10YR 7/1) clay loam; common medium distinct pale brown (10YR 6/3) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg1—38 to 45 inches; light gray (10YR 7/1) loam; common medium distinct pale brown (10YR 6/3) and brownish yellow (10YR 6/6) and common fine distinct very dark grayish brown (10YR 3/2) mottles; massive; friable; few fine flakes of mica; moderately acid; gradual wavy boundary.

Cg2—45 to 56 inches; light brownish gray (10YR 6/2) clay loam; common medium distinct pale brown (10YR 6/3), black (10YR 2/1), and brownish yellow (10YR 6/6) mottles; massive; friable; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg3—56 to 62 inches; light gray (10YR 7/1) loam; common medium distinct white (10YR 8/1) and dark yellowish brown (10YR 4/6) mottles; massive; friable; few fine flakes of mica; slightly acid.

The solum is 15 to 70 inches thick. Reaction ranges from very strongly acid to slightly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4 or hue of 7.5YR, value of 4 or 5, and chroma of 4.

The Bw horizon has hue of 10YR to 5YR, value of 4 to 7, and chroma of 3 to 8. It is mottled in shades of

brown. It is sandy loam, loam, or clay loam. In some pedons it has dark concretions.

The Bg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is sandy loam, loam, or clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, yellow, or gray. It is clay loam, sandy clay loam, loam, sandy loam, loamy sand, or sand and may be stratified.

Congaree Series

The Congaree series consists of well drained, moderately permeable soils that formed in loamy alluvial sediments. These soils are on flood plains. Slopes range from 0 to 2 percent.

Typical pedon of Congaree loam, in an area of Chewacla and Congaree loams, frequently flooded; about 1.5 miles east of Lillington on Secondary Road 2016, north 0.6 mile on Secondary Road 2069, about 600 feet west of the boat ramp at the end of the road, about 150 feet south of the Cape Fear River:

A—0 to 18 inches; brown (10YR 5/3) loam; weak coarse granular structure; very friable; many fine roots; common fine flakes of mica; slightly acid; clear smooth boundary.

C1—18 to 38 inches; dark brown (7.5YR 4/4) loam; common coarse faint yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; common fine roots; common fine flakes of mica; moderately acid; gradual smooth boundary.

C2—38 to 58 inches; dark yellowish brown (10YR 4/4) silt loam; few medium faint pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few fine roots; common fine flakes of mica; strongly acid; gradual smooth boundary.

C3—58 to 70 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light gray (10YR 7/2) mottles; weak fine subangular blocky structure; friable; common fine flakes of mica; strongly acid.

The loamy underlying material extends to a depth of more than 60 inches. Reaction is very strongly acid to neutral. Most pedons have few to many flakes of mica throughout the profile.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. The C horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6. It is mottled in shades of red, brown, and yellow. In most pedons it has mottles in shades of gray below a depth of 20 inches. It is fine sandy loam, loam, silt loam, or silty clay loam.

Coxville Series

The Coxville series consists of poorly drained, moderately slowly permeable soils that formed in clayey Coastal Plain sediments. These soils are in depressions. Slopes range from 0 to 2 percent.

Typical pedon of Coxville loam; about 1.6 miles north of Erwin on North Carolina Highway 55, west 1.4 miles on Secondary Road 2009, about 1,500 feet south of the road, in a Carolina bay:

Ap—0 to 6 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.

Btg1—6 to 12 inches; gray (10YR 5/1) sandy clay loam; weak medium subangular blocky structure; firm; many fine roots; few patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg2—12 to 36 inches; gray (10YR 5/1) clay; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; very firm, sticky and plastic; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—36 to 60 inches; gray (10YR 5/1) clay; common fine distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very firm, sticky and plastic; few patchy clay films on faces of peds; very strongly acid.

The solum is 40 to more than 80 inches thick. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of brown, yellow, and red. It is sandy clay or clay. In some pedons it has thin layers or pockets of sandy clay loam below a depth of 40 inches.

The Cg horizon, if it occurs, has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of red, brown, yellow, and gray. Texture varies from sand to clay. In most pedons the horizon is stratified.

Dothan Series

The Dothan series consists of well drained, moderately slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 6 percent.

Typical pedon of Dothan loamy sand, 0 to 2 percent slopes; about 11.1 miles west of Lillington on U.S.

Highway 421, south 3.7 miles on Secondary Road 1229, about 250 feet west on Secondary Road 1226, about 250 feet south, in a field:

Ap—0 to 10 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt wavy boundary.
E—10 to 12 inches; pale yellow (2.5Y 7/4) loamy sand; weak fine granular structure; very friable; many fine roots; moderately acid; clear smooth boundary.
Bt1—12 to 18 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky; common fine roots; common fine pores; few patchy clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt2—18 to 26 inches; yellowish brown (10YR 5/6) sandy clay loam; few fine faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable, sticky; common fine roots; common fine pores; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.
Bt3—26 to 40 inches; brownish yellow (10YR 6/6) sandy clay loam; many medium distinct red (2.5YR 4/8) mottles; weak fine subangular blocky structure; friable, sticky; few fine roots; common fine pores; few patchy clay films on faces of peds; few nodules of plinthite; very strongly acid; gradual wavy boundary.
Btv1—40 to 60 inches; mottled yellowish brown (10YR 5/6), very pale brown (10YR 7/3), and red (2.5YR 4/8) sandy clay loam; weak medium platy structure breaking to weak medium subangular blocky; friable, sticky; few patchy clay films on faces of peds; about 15 percent nodules of plinthite and 3 percent fine quartz pebbles; very strongly acid; gradual wavy boundary.
Btv2—60 to 80 inches; mottled yellowish brown (10YR 5/8), brownish yellow (10YR 6/6), red (2.5YR 5/8), and white (10YR 8/1) sandy clay loam; weak thick platy structure parting to weak medium subangular blocky; firm, sticky; about 10 percent nodules of plinthite and 5 percent fine quartz pebbles; very strongly acid.

The solum is 60 to more than 80 inches thick. The depth to a horizon that contains 5 percent or more plinthite ranges from 24 to 60 inches. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4. The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. It is sandy loam, fine sandy loam, loamy fine sand, or loamy sand.

The BE or BA horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 4 to 8. It is mottled in shades of red or brown. It is fine sandy loam or sandy clay loam.

The Btv horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 4 to 8 and is mottled in shades of red, white, brown, and gray. It contains 5 to 35 percent plinthite. It is sandy clay loam, clay loam, or sandy clay.

Dystrochrepts

Dystrochrepts consist of well drained soils that formed on bluffs and in deep gullies above the Cape Fear River and its major tributaries. They formed in unconsolidated sediments exposed by downcutting of the river. Slopes range from 25 to 65 percent.

Reference pedon of Dystrochrepts, steep; about 1.5 miles south of Erwin on North Carolina Highway 82, about 0.75 mile west on Secondary Road 1777, west about 100 feet, in a wooded area:

Oe—2 inches to 0; decomposed hardwood leaves and twigs.
A—0 to 2 inches; dark grayish brown (10YR 4/2) loam; weak medium granular structure; friable; many fine and medium roots; very strongly acid; clear smooth boundary.
Bw1—2 to 25 inches; brownish yellow (10YR 6/6) sandy loam; weak medium granular structure; friable; common fine flakes of mica; very strongly acid; gradual irregular boundary.
Bw2—25 to 40 inches; strong brown (7.5YR 5/6) sandy loam; weak fine granular structure; friable; common fine flakes of mica; very strongly acid; clear wavy boundary.
C1—40 to 50 inches; strong brown (7.5YR 5/8) gravelly sand; single grained; loose; very strongly acid; gradual broken boundary.
C2—50 to 72 inches; brownish yellow (10YR 6/6) sandy clay; massive; many fine and medium flakes of mica; very strongly acid.

The solum is 30 to more than 60 inches thick. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2.

The Bw horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, sandy clay loam, or clay loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 1 to 8. In the fine-earth fraction, it is sandy loam, sandy clay loam, sandy clay, or clay loam.

Enon Series

The Enon series consists of well drained, slowly permeable soils that formed in material weathered from dark, mafic crystalline rocks. These soils are on uplands. Slopes range from 2 to 15 percent.

Typical pedon of Enon fine sandy loam, 2 to 8 percent slopes; about 4.3 miles north of Mamers on Secondary Road 1265, about 100 feet east of the road, in a pasture:

Ap—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; moderate medium granular structure; friable; many fine roots; moderately alkaline; abrupt smooth boundary.

Bt1—5 to 20 inches; yellowish brown (10YR 5/8) clay; many medium distinct yellowish red (5YR 4/8) mottles; weak coarse subangular blocky structure; very firm, plastic and very sticky; common fine roots; common patchy clay films on faces of peds; neutral; clear smooth boundary.

Bt2—20 to 24 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct yellowish red (5YR 4/8) and few medium distinct gray (10YR 5/1) mottles; moderate medium angular blocky structure; firm, plastic and sticky; common fine roots; common patchy clay films on faces of peds; common fine flakes of mica; strongly acid; clear smooth boundary.

C—24 to 60 inches; yellowish brown (10YR 5/6) loam that has common gray (10YR 5/1) vertically oriented pockets of clay; massive; friable; few fine roots; many fine flakes of mica; about 15 percent chlorite schist; slightly acid.

The solum is 20 to 40 inches thick. The content of coarse fragments, which are mostly schist, ranges from 0 to 15 percent. Reaction is strongly acid to slightly acid in the A horizon, except where limed, and slightly acid to mildly alkaline in the B and C horizons.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8. It is mottled in shades of red, brown, or yellow. In most pedons it has mottles in shades of gray in the lower part. It is clay or clay loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 4 to 8 or is multicolored. It is loam, sandy loam, or clay loam consisting of saprolite.

Exum Series

The Exum series consists of moderately well drained, moderately slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are on broad uplands. Slopes range from 0 to 2 percent.

Typical pedon of Exum very fine sandy loam, 0 to 2 percent slopes; about 2.6 miles south of Lillington on U.S. Highway 401, about 50 feet west of the highway, in a field:

Ap—0 to 8 inches; brown (10YR 5/3) very fine sandy loam; weak medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bt1—8 to 24 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; firm, sticky and plastic; many fine roots; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—24 to 34 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct yellowish red (5YR 5/8), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—34 to 48 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct red (2.5YR 5/8) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; firm, sticky and plastic; few fine roots; few patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt4—48 to 80 inches; mottled red (2.5YR 5/8), gray (10YR 6/1), and strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; firm, sticky and plastic; few patchy clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 2 to 6, and chroma of 1 to 3. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is silt loam, loam, or very fine sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of red, yellow, brown, and gray. It is loam, clay loam, silt loam, or silty clay loam.

The Btg or BCg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of red, yellow, brown, and gray. It is loam, clay loam, silt loam, or silty clay loam.

Fuquay Series

The Fuquay series consists of well drained, slowly permeable soils that formed in loamy sediments of the

Upper Coastal Plain region. These soils are on uplands. Slopes range from 0 to 6 percent.

Typical pedon of Fuquay loamy sand, 0 to 6 percent slopes; about 1.2 miles south of Angier on North Carolina Highway 210, east 100 yards on Secondary Road 1507, about 100 feet south of the road, 50 feet east of a tobacco barn:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; strongly acid; abrupt smooth boundary.

E—10 to 28 inches; very pale brown (10YR 7/3) loamy sand; weak fine granular structure; very friable; strongly acid; clear wavy boundary.

BE—28 to 36 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few smooth nodules of iron; strongly acid; clear wavy boundary.

Bt1—36 to 44 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium distinct yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; friable; few smooth nodules of iron; few patchy clay films on faces of peds; strongly acid; clear wavy boundary.

Btv1—44 to 62 inches; mottled red (2.5YR 4/6), strong brown (7.5YR 5/8), and light gray (10YR 7/1) sandy clay loam; weak medium subangular blocky structure; friable; about 20 percent plinthite; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Btv2—62 to 80 inches; brownish yellow (10YR 6/8) sandy clay loam; common medium distinct yellowish red (5YR 5/8) and light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; about 10 percent plinthite and 15 percent yellowish red brittle bodies; strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 6. It is loamy sand or loamy fine sand.

The BE horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. It is sandy loam or loamy sand.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, or gray. It is sandy loam, fine sandy loam, or sandy clay loam.

The Btv horizon has hue of 2.5YR to 10YR, value of 4 to 8, and chroma of 1 to 8 or is mottled in shades of these colors. It contains 5 to 20 percent plinthite. It is sandy loam, fine sandy loam, or sandy clay loam.

The C horizon, if it occurs, has hue of 2.5YR to 2.5Y, value of 4 to 8, and chroma of 1 to 8 or is mottled in shades of these colors. It is sandy loam or loamy sand.

Gilead Series

The Gilead series consists of moderately well drained, moderately slowly permeable and slowly permeable, clayey soils that formed in upper Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 15 percent.

Typical pedon of Gilead loamy sand, 8 to 15 percent slopes; about 3.4 miles north of Olivia on North Carolina Highway 87, west 0.4 mile on North Carolina Highway 27, about 0.4 mile north of a subdivision road, on the south bank of the road:

Ap—0 to 5 inches; pale brown (10YR 6/3) loamy sand; weak medium granular structure; very friable; many coarse and medium roots; moderately acid; abrupt smooth boundary.

Bt1—5 to 8 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable; common medium roots; strongly acid; clear smooth boundary.

Bt2—8 to 22 inches; reddish yellow (7.5YR 6/6) sandy clay; common fine distinct yellowish red (5YR 5/6) and white (5YR 8/1) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common fine and medium roots; many distinct continuous clay films on faces of peds; common medium flakes of mica; very strongly acid; clear smooth boundary.

Bt3—22 to 42 inches; brownish yellow (10YR 6/8) sandy clay; many medium distinct light gray (10YR 7/1) and common medium prominent dark reddish brown (2.5YR 3/4) mottles; weak medium subangular blocky structure; very firm, sticky and plastic; common medium roots along faces of peds; common distinct patchy clay films on faces of peds; common flakes of mica; very strongly acid; clear wavy boundary.

Bt4—42 to 52 inches; brownish yellow (10YR 6/8) sandy clay loam; many coarse prominent white (10YR 8/1) mottles; weak coarse subangular blocky structure; firm; common medium flakes of mica; strongly acid; clear wavy boundary.

C—52 to 72 inches; mottled brownish yellow (10YR 6/8) and light gray (10YR 7/1) sandy clay loam; massive; friable; common medium flakes of mica; very strongly acid; abrupt smooth boundary.

2Cg1—72 to 76 inches; white (N 8/0) clay; massive; very firm; strongly acid; clear smooth boundary.

3Cg2—76 to 80 inches; light gray (10YR 7/1) gravelly sand; strongly acid.

The solum is 24 to 60 inches thick. The content of coarse fragments, which are mostly quartz pebbles, ranges from 0 to 20 percent. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is loamy sand or sandy loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, gray, or white. It is sandy clay loam, clay loam, or sandy clay.

The Btg or BCg horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of red, brown, yellow, gray, or white. It is sandy clay loam, clay loam, or sandy clay.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, gray, or white. It is gravelly sand, sandy loam, sandy clay loam, clay loam, sandy clay, or clay.

The Cg horizon has hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 1 or 2; is neutral in hue and has value of 4 to 8; or is mottled in shades of these colors. It is gravelly sand, sandy loam, sandy clay loam, clay loam, sandy clay, or clay.

Goldsboro Series

The Goldsboro series consists of moderately well drained, moderately permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 2 percent.

Typical pedon of Goldsboro loamy sand, 0 to 2 percent slopes; 1.5 miles north of Dunn on Secondary Road 1715, about 0.5 mile north of the intersection of Secondary Roads 1715 and 1705, about 50 feet west of Secondary Road 1715:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

E—8 to 12 inches; light yellowish brown (2.5Y 6/4) loamy sand; weak medium granular structure; very friable; many fine roots; strongly acid; clear smooth boundary.

Bt1—12 to 28 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; common fine roots; strongly acid; gradual smooth boundary.

Bt2—28 to 52 inches; light yellowish brown (10YR 6/4) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) and common fine faint light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; strongly acid; gradual smooth boundary.

Bt3—52 to 75 inches; mottled yellowish brown (10YR 5/8), yellowish red (5YR 4/8), and light gray (10YR 7/2) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few concretions; strongly acid.

The solum is more than 60 inches thick. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6. It is loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

The upper part of the Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 3 to 8. The lower part has hue of 7.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8 or has mottles in shades of these colors. The depth to gray mottles ranges from 18 to 30 inches. Texture is sandy clay loam or sandy loam.

The BCg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of red, brown, yellow, or gray. It is sandy loam and may be stratified with sand or sandy clay loam.

Grantham Series

The Grantham series consists of poorly drained, moderately slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 2 percent.

Typical pedon of Grantham loam; about 1.0 mile east of Lillington on Secondary Road 2016, southeast 1.5 miles on Secondary Road 2017, about 0.5 mile southwest of grain bins on a farm road adjacent to a drainage ditch, in a field:

Ap—0 to 5 inches; very dark gray (10YR 3/1) loam; moderate fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Btg1—5 to 11 inches; light brownish gray (10YR 6/2) clay loam; many medium distinct brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and medium roots; many fine pores; few patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg2—11 to 32 inches; light brownish gray (10YR 6/2) clay loam; many medium prominent brownish yellow (10YR 6/6) and common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; common fine pores; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Btg3—32 to 50 inches; gray (10YR 6/1) silty clay loam; many coarse prominent brownish yellow (10YR 6/6) and red (2.5YR 4/8) vertically oriented mottles; weak fine subangular blocky structure; firm, sticky; few fine pores; few patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

Btg4—50 to 80 inches; light gray (10YR 7/1) clay loam; many coarse prominent yellowish brown (10YR 5/8) and few fine prominent red (2.5YR 5/8) vertically oriented mottles; weak coarse subangular blocky structure; firm, sticky and plastic; few fine pores; few patchy clay films on faces of peds; very strongly acid.

The solum is more than 60 inches thick. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. The Eg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is very fine sandy loam, loam, or silt loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of yellow, brown, or red. It is loam, clay loam, or silty clay loam.

The BCg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of yellow, brown, or red. It is loam, clay loam, or silty clay loam.

The Cg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of yellow, brown, or red. It is variable in texture, consisting of stratified layers of sand, sandy loam, sandy clay loam, silty clay loam, or clay that vary in thickness.

Helena Series

The Helena series consists of moderately well drained, slowly permeable soils that formed in material weathered from mixed felsic and mafic crystalline rock. These soils are on uplands. Slopes range from 2 to 8 percent.

Typical pedon of Helena fine sandy loam, 2 to 8 percent slopes; about 6.5 miles north of Lillington on U.S. Highway 401 at intersection of Secondary Road 1403 at Kipling, about 1.6 miles west on Secondary Road 1403, about 200 feet south of the road:

Ap—0 to 8 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; moderately acid; abrupt smooth boundary.

Bt1—8 to 15 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium prominent reddish brown (2.5YR 5/4) and common medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few patchy clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—15 to 21 inches; light yellowish brown (10YR 6/4) clay; common medium distinct light gray (10YR 7/1) and brownish yellow (10YR 6/8) and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; common patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg1—21 to 27 inches; light gray (10YR 7/1) clay; common medium distinct light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/8) and few medium prominent red (2.5YR 5/6) mottles; moderate medium angular blocky structure; very firm; common patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Btg2—27 to 42 inches; light gray (10YR 7/1) clay; common medium distinct light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/8) mottles; moderate coarse or medium angular blocky structure; very firm; common patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

BCg—42 to 48 inches; white (10YR 8/1) sandy clay loam that has pockets of clay; common medium distinct brownish yellow (10YR 6/8) and very pale brown (10YR 7/3) mottles; moderate medium angular blocky structure; friable or firm; few patchy clay films on faces of peds; few fine flakes of mica; very strongly acid; gradual wavy boundary.

Cg—48 to 60 inches; light gray (10YR 7/1) sandy loam that has pockets of clay; common medium distinct brownish yellow (10YR 6/8) and very pale brown (10YR 7/3) mottles; massive; friable or firm; few fine and medium flakes of mica; very strongly acid.

The solum is 40 to 60 inches thick. The content of coarse fragments, which are mostly quartz pebbles, ranges from 0 to 15 percent. Reaction is extremely acid or very strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 4. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 to 4. It is loamy sand, sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 7.5YR to 5Y, value of 5 to 8, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, or gray. It is clay loam, sandy clay, or clay.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of red, brown, yellow, or gray. It is clay loam, sandy clay, or clay.

The BCg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. It is mottled in shades of red, brown, yellow, or gray. It is fine sandy loam, loam, clay loam, or sandy clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of red, brown, yellow, or gray. It is sandy loam, fine sandy loam, loam, or sandy clay loam. In most pedons it has bodies or seams of clay or clay loam.

Lakeland Series

The Lakeland series consists of excessively drained, rapidly permeable soils that formed in thick deposits of sand. These soils are on uplands. Slopes range from 0 to 8 percent.

Typical pedon of Lakeland sand, 0 to 8 percent slopes; about 2.0 miles south of Bunnlevel on U.S. Highway 401, about 50 feet east of the highway:

A—0 to 6 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; few fine roots; common fine particles of organic matter and few organic coatings; very strongly acid; clear wavy boundary.

C1—6 to 60 inches; yellowish brown (10YR 5/6) sand; single grained; loose; about 10 percent uncoated sand grains; very strongly acid; gradual wavy boundary.

C2—60 to 80 inches; reddish yellow (7.5YR 6/8) sand; single grained; loose; about 50 percent uncoated sand grains; strongly acid.

The sandy material extends to a depth of more than 80 inches. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The C horizon has hue of 10YR, value of 4 to 7, and chroma of 3 to 8 or hue of 7.5YR, value of 5 or 6, and chroma of 6 to 8. In some pedons it has small pockets of gray or white sand below a depth of 40 inches.

Lillington Series

The Lillington series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on high terraces in the Upper Coastal Plains region. Slopes range from 2 to 25 percent.

Typical pedon of Lillington very gravelly sandy loam, 2 to 8 percent slopes; 5.9 miles west of Lillington on U.S. Highway 421, north 3.0 miles on Secondary Road 1314, about 2,200 feet east of the road:

Ap—0 to 6 inches; brown (10YR 4/3) very gravelly sandy loam; weak medium granular structure; very friable; many fine and medium roots; about 50 percent rounded gravel as much as 3 inches in diameter; moderately acid; clear smooth boundary.

E—6 to 10 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam; weak medium granular structure; very friable; few fine roots; about 50 percent rounded gravel as much as 3 inches in diameter; moderately acid; clear wavy boundary.

BA—10 to 16 inches; strong brown (7.5YR 5/8) very gravelly sandy loam; weak fine subangular blocky structure; friable; few fine roots; about 55 percent rounded gravel as much as 3 inches in diameter; moderately acid; gradual wavy boundary.

Bt—16 to 44 inches; red (2.5YR 4/8) very gravelly sandy clay loam; weak medium subangular blocky structure; friable, sticky and plastic; few fine roots; thin patchy clay films on faces of peds; about 55 percent rounded gravel as much as 3 inches in diameter; strongly acid; clear wavy boundary.

BC—44 to 66 inches; mixed reddish yellow (7.5YR 6/6), red (10R 4/6), and light yellowish brown (10YR 6/4) extremely gravelly sandy loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few thin discontinuous clay films on faces of peds and on some pebbles; about 75 percent rounded gravel as much as 3 inches in diameter; strongly acid; gradual wavy boundary.

C—66 to 80 inches; reddish yellow (7.5YR 6/6) very gravelly sandy loam stratified with layers of loamy sand and sandy clay loam; common medium distinct red (2.5YR 4/8) and light gray (10YR 7/1) mottles; massive; friable; about 35 percent rounded gravel as much as 3 inches in diameter; strongly acid.

The solum is more than 60 inches thick. The depth to bedrock is more than 60 inches and is commonly more than 80 inches. The content of coarse fragments ranges from 35 to 80 percent. Reaction is strongly acid or very strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4. It is very gravelly or extremely gravelly loamy sand or sandy loam.

The BA horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is very gravelly or extremely gravelly sandy loam or loam.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8. It is very gravelly or extremely gravelly sandy clay loam or clay loam.

The BC horizon has hue of 10R to 10YR, value of 4 to 7, and chroma of 4 to 8 or is mixed in shades of these colors. It is very gravelly or extremely gravelly sandy loam, loam, or sandy clay loam.

The C horizon has hue of 10R to 10YR, value of 4 to 7, and chroma of 1 to 8 or is multicolored. It is very gravelly or extremely gravelly sandy loam, loamy sand, and sandy clay loam. In most pedons it is stratified with these textures or with clayey material.

Louisa Series

The Louisa series consists of somewhat excessively drained, moderately rapidly permeable soils that formed in material weathered from micaceous rocks. These soils are on upland side slopes in the Piedmont region. Slopes range from 25 to 45 percent.

Typical pedon of Louisa fine sandy loam, 25 to 45 percent slopes; about 5.9 miles west of Lillington on U.S. Highway 421, north 3.6 miles on Secondary Road 1314 to Raven Rock State Park, about 50 feet east of the park sign to the site of Northington's Ferry:

Oi—2 inches to 1 inch; undecomposed hardwood leaf litter.

Oe—1 inch to 0; partly decomposed hardwood litter.

A—0 to 2 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; friable; many medium and coarse roots; common fine flakes of mica; about 5 percent fragments of micaceous schist; strongly acid; clear smooth boundary.

E—2 to 7 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; friable; many medium and coarse roots; common fine flakes of mica; about 5 percent fragments of micaceous schist; strongly acid; clear smooth boundary.

Bw—7 to 15 inches; yellowish brown (10YR 5/4) loam that has a few small pockets of sandy clay loam; weak medium subangular blocky structure; friable; common medium and coarse roots; many fine flakes of mica; about 5 percent fragments of micaceous schist; strongly acid; gradual wavy boundary.

C1—15 to 20 inches; pale brown (10YR 6/3) micaceous schist; gradual wavy boundary.

C2—20 to 32 inches; light brownish gray (10YR 6/2) micaceous schist.

The solum is 10 to 20 inches thick. The depth to soft bedrock ranges from 10 to 20 inches. The content of coarse fragments, which are mostly micaceous schist, ranges from 5 to 15 percent. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 4 to 8. It is loam, sandy clay loam, or clay loam. The C horizon is soft, weathered, micaceous schist that increases in hardness with increasing depth.

Lynchburg Series

The Lynchburg series consists of somewhat poorly drained, moderately permeable soils that formed in loamy marine sediments. These soils are in shallow depressions, at the head of drainageways, and on broad divides. Slopes range from 0 to 2 percent.

Typical pedon of Lynchburg sandy loam; about 1.6 miles west of Dunn on Secondary Road 1735, about 150 feet north of the road:

Ap—0 to 6 inches; very dark gray (10YR 3/1) sandy loam; weak medium granular structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.

Bt—6 to 18 inches; light yellowish brown (10YR 6/4) sandy clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; common fine roots; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.

Btg1—18 to 36 inches; gray (10YR 6/1) sandy clay loam; common medium distinct brownish yellow (10YR 6/6) mottles; weak fine subangular blocky structure; friable; few fine roots; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.

Btg2—36 to 54 inches; gray (10YR 6/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; few patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Btg3—54 to 72 inches; mottled gray (10YR 5/1), yellowish brown (10YR 5/8), and red (2.5YR 4/6) sandy clay loam; weak coarse subangular blocky

structure; friable; few patchy clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, and gray. It is sandy clay loam, clay loam, or sandy loam.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, yellow, and gray. It is sandy clay loam, clay loam, or sandy loam.

Marlboro Series

The Marlboro series consists of well drained, moderately permeable soils that formed in clayey Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 6 percent.

Typical pedon of Marlboro sandy loam, 0 to 2 percent slopes; 1.0 mile north of Erwin on Secondary Road 1703, about 100 feet east of the road, about 300 feet southwest of the Durham and Southern Railway:

Ap—0 to 7 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; common fine roots; neutral; abrupt smooth boundary.

E—7 to 10 inches; light yellowish brown (10YR 6/4) sandy loam; weak fine granular structure; very friable; common fine roots; neutral; clear smooth boundary.

BE—10 to 14 inches; brownish yellow (10YR 6/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; slightly acid; clear smooth boundary.

Bt1—14 to 24 inches; yellowish brown (10YR 5/8) sandy clay; weak fine subangular blocky structure; firm, sticky and plastic; few fine roots; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—24 to 52 inches; yellowish brown (10YR 5/8) clay loam; many coarse faint yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; firm, sticky and plastic; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—52 to 72 inches; yellowish brown (10YR 5/8) sandy clay; many medium distinct red (2.5YR 4/8) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

BC—72 to 80 inches; variegated strong brown (7.5YR 5/8), red (2.5YR 4/8), and light gray (10YR 7/2) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid to slightly acid in the A and E horizons, except where limed, and very strongly acid to moderately acid in the B horizon.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 3 to 5. It is sandy loam, fine sandy loam, or loamy sand.

The BE horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is sandy clay loam or sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8. It is mottled in shades of red or brown. It is sandy clay, clay loam, or clay.

The BC horizon has hue of 2.5YR to 10YR, value of 4 or 5, and chroma of 4 to 8. It is mottled in shades of red, brown, yellow, and gray. It is sandy clay loam, sandy clay, or clay.

Nahunta Series

The Nahunta series consists of somewhat poorly drained, moderately permeable soils that formed in loamy marine sediments. These soils are on broad flats and in shallow Coastal Plain depressions. Slopes range from 0 to 2 percent.

Typical pedon of Nahunta loam; about 3.3 miles south of Lillington on U.S. Highway 401, about 1.0 mile east on Secondary Road 2034, north 0.6 mile on an access road for a gravel pit, 300 feet west of the road:

Ap—0 to 5 inches; very dark gray (10YR 3/1) loam; weak medium granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

E—5 to 7 inches; pale brown (10YR 6/3) loam; weak medium granular structure; many fine roots; very strongly acid; abrupt smooth boundary.

Bt—7 to 12 inches; light yellowish brown (10YR 6/4) silty clay loam; many fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm, slightly sticky; many fine roots; few patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

Btg1—12 to 24 inches; light gray (10YR 7/1) silty clay

loam; many coarse prominent brownish yellow (10YR 6/6) mottles; moderate medium subangular blocky structure; firm, slightly sticky and plastic; common fine roots; common patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Btg2—24 to 56 inches; light gray (10YR 7/1) silty clay loam; many coarse prominent yellowish brown (10YR 5/8) and common medium prominent light olive brown (2.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, very sticky and plastic; few fine roots; common patchy clay films on faces of peds; extremely acid; gradual smooth boundary.

Btg3—56 to 69 inches; light gray (10YR 7/1) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; very firm, very sticky and plastic; extremely acid; gradual smooth boundary.

BCg—68 to 80 inches; light gray (10YR 7/1) clay loam; many medium prominent yellowish brown (10YR 5/8) mottles; massive; very firm; extremely acid.

The solum is 60 to more than 80 inches thick. Reaction is very strongly acid to moderately acid in the A and E horizons, except where limed, and extremely acid or very strongly acid in the B horizon.

The Ap or A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4. It is very fine sandy loam, loam, or silt loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is mottled in shades of brown or gray. It is clay loam, loam, or silty clay loam.

The Btg horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. It is mottled in shades of red, brown, yellow, or gray. It is clay loam, loam, or silty clay loam.

The BCg horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. It is mottled in shades of red, brown, yellow, or gray. It is clay loam, silt loam, silty clay loam, or loam.

Nason Series

The Nason series consists of well drained, moderately permeable soils that formed in material weathered from sericite schists, phyllites, or slates. These soils are on side slopes in the uplands. Slopes range from 8 to 25 percent.

Typical pedon of Nason silt loam, 8 to 15 percent slopes; about 2.7 miles north of Lillington on North Carolina Highway 210, west 0.3 mile on Secondary Road 1435, about 900 feet south on a private road, 150 feet southwest of a house:

Ap—0 to 6 inches; brown (7.5YR 5/4) silt loam; moderate medium subangular blocky structure; friable, sticky and plastic; common fine roots; strongly acid; abrupt smooth boundary.

Bt1—6 to 24 inches; strong brown (7.5YR 5/6) clay; common fine distinct yellowish brown (10YR 5/6) and red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; many continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—24 to 34 inches; strong brown (7.5YR 5/6) silty clay loam; many coarse distinct brownish yellow (10YR 6/8) and common medium distinct light gray (10YR 7/2) mottles; moderate coarse subangular blocky structure; slightly sticky and slightly plastic; common patchy clay films on faces of peds; about 40 percent phyllite saprolite; very strongly acid; gradual wavy boundary.

C—34 to 44 inches; multicolored silt loam consisting of saprolite; massive; friable; about 30 percent hard phyllite fragments; very strongly acid; gradual wavy boundary.

Cr—44 to 60 inches; multicolored phyllite that can be dug with difficulty using a spade.

The solum is 25 to 50 inches thick. The depth to soft bedrock ranges from 40 to 60 inches. The content of coarse fragments, which are mostly quartz or phyllite, ranges from 0 to 35 percent in the A and Bt horizons and from 15 to 40 percent in the BC and C horizons. Reaction is strongly acid or very strongly acid, except where the surface layer has been limed.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. Some pedons have an A horizon that has hue of 10YR and value and chroma of 2 to 4.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is mottled in shades of brown or red. In the fine-earth fraction, it is silty clay, clay, silty clay loam, or clay loam.

The BC horizon, if it occurs, has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is mottled in shades of brown or red. In the fine-earth fraction, it is silt loam, loam, silty clay loam, or clay loam.

The C horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8 or is multicolored. It is mottled in shades of brown and red. In the fine-earth fraction, it is silt loam or silty clay loam.

The Cr horizon is multicolored, soft, weathered phyllite that can be dug with difficulty using a spade.

Norfolk Series

The Norfolk series consists of well drained, moderately permeable soils that formed in loamy Coastal Plain sediments. These soils are on uplands. Slopes range from 0 to 10 percent.

Typical pedon of Norfolk loamy sand, 2 to 6 percent slopes; about 2.7 miles north of Lillington on North Carolina Highway 210, west 0.3 mile on Secondary Road 1435, about 200 feet south on a private road, 100 feet east of the road, in a field:

Ap—0 to 7 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine roots; few small iron concretions; moderately acid; abrupt smooth boundary.

E—7 to 11 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable; common fine roots; moderately acid; clear smooth boundary.

BE—11 to 16 inches; brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; very friable; common fine roots; very strongly acid; clear smooth boundary.

Bt1—16 to 28 inches; yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few patchy clay films on faces of peds; few fine concretions; very strongly acid; gradual wavy boundary.

Bt2—28 to 38 inches; yellowish brown (10YR 5/8) sandy clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; common continuous clay films on faces of peds; few fine concretions; very strongly acid; gradual wavy boundary.

Bt3—38 to 52 inches; strong brown (7.5YR 5/8) sandy clay loam; many coarse distinct red (2.5YR 5/8) mottles; weak medium subangular blocky structure; friable, sticky and slightly plastic; common discontinuous clay films on faces of peds; about 3 percent plinthite; few fine concretions; very strongly acid; gradual wavy boundary.

Bt4—52 to 80 inches; strong brown (7.5YR 5/8) sandy clay loam; common medium distinct light gray (10YR 7/2) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable, firm in place, sticky and slightly plastic; about 3 percent plinthite; common fine concretions; very strongly acid.

The solum is more than 60 inches thick. Reaction is extremely acid or very strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR, value of 4 to 7, and chroma of 2 or 3. The E horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is loamy sand, sandy loam, fine sandy loam, or loamy fine sand.

The BE horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 to 8. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 3 to 8. It is mottled in shades of red or brown. In most pedons it has mottles in shades of gray below a depth of 48 inches. It is sandy clay loam or clay loam.

The BC horizon, if it occurs, has hue of 5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. It is mottled in shades of red, brown, or gray. It is sandy loam, sandy clay loam, clay loam, sandy clay, or clay.

Orangeburg Series

The Orangeburg series consists of well drained, moderately permeable soils that formed in loamy Coastal Plain sediments. These soils are on convex divides and upland side slopes. Slopes range from 2 to 6 percent.

Typical pedon of Orangeburg loamy sand, 2 to 6 percent slopes; about 3.0 miles south of Lillington on North Carolina Highway 210, about 1,000 feet east on Secondary Road 2072, about 50 feet south of the road, in a field:

Ap—0 to 8 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; neutral; abrupt smooth boundary.

E—8 to 19 inches; light yellowish brown (10YR 6/4) loamy sand; weak fine granular structure; very friable; moderately acid; clear smooth boundary.

BE—19 to 24 inches; strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure; friable; few fine roots; moderately acid; clear smooth boundary.

Bt1—24 to 34 inches; red (2.5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few fine roots; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—34 to 64 inches; red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable, sticky and slightly plastic; few patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—64 to 80 inches; red (2.5YR 4/6) sandy clay loam; common medium distinct yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure;

friable, slightly sticky and slightly plastic; few patchy clay films on faces of peds; very strongly acid.

The solum is 70 inches or more thick. Reaction ranges from very strongly acid to moderately acid in the A, E, and BE horizons and the upper part of the Bt horizon, except where the surface layer has been limed. The lower part of the Bt horizon is very strongly acid or strongly acid.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. It is loamy sand or sand.

The BE horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or loam.

The Bt horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is mottled in shades of red or brown. It is sandy loam or sandy clay loam.

The BC horizon, if it occurs, has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 to 8. It is mottled in shades of red or brown. It is sandy loam, sandy clay loam, or sandy clay.

Pacolet Series

The Pacolet series consists of well drained, moderately permeable soils that formed in material weathered from acid crystalline rocks. These soils are on upland side slopes. Slopes range from 15 to 25 percent.

Typical pedon of Pacolet fine sandy loam, 15 to 25 percent slopes; about 11.0 miles northwest of Lillington on Secondary Road 1418, about 300 feet west of Avents Creek, about 150 feet south of the road:

Oi—2 inches to 1 inch; undecomposed pine and hardwood litter.

Oe—1 inch to 0; partly decomposed forest litter.

A—0 to 3 inches; grayish brown (10YR 5/2) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent fine quartz pebbles; very strongly acid; clear smooth boundary.

E—3 to 6 inches; pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; about 5 percent fine quartz pebbles; very strongly acid; clear smooth boundary.

Bt1—6 to 10 inches; yellowish red (5YR 5/6) clay loam; common coarse faint light brown (7.5YR 6/4) mottles; weak fine subangular blocky structure; firm, slightly sticky and slightly plastic; common fine roots; common flakes of mica; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—10 to 21 inches; red (2.5YR 5/6) clay; moderate fine subangular blocky structure; firm, slightly sticky and slightly plastic; common fine roots; common flakes of mica; few patchy clay films on faces of peds; strongly acid; clear smooth boundary.

BC—21 to 29 inches; yellowish red (5YR 5/6) clay loam; many medium distinct pink (7.5YR 7/4) mottles; weak fine subangular blocky structure; friable; common fine flakes of mica; few patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

C1—29 to 48 inches; reddish yellow (7.5YR 7/6) fine sandy loam consisting of saprolite weathered from micaceous schist; many coarse distinct pinkish gray (7.5YR 7/2) mottles; massive; friable; very strongly acid; gradual wavy boundary.

C2—48 to 60 inches; multicolored sandy loam consisting of saprolite weathered from micaceous schist; massive; friable; very strongly acid.

The solum is 18 to 30 inches thick. The depth to hard bedrock is more than 60 inches. Reaction is strongly acid or moderately acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 to 4. The E horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 3 to 8. It is sandy loam, loamy sand, fine sandy loam, or gravelly sandy loam.

The Bt horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is mottled in shades of brown or yellow. It is clay loam, sandy clay, or clay.

The BC horizon has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. It is mottled in shades of brown or yellow. It is clay loam, sandy clay, loam, or sandy loam.

The C horizon is multicolored or has hue of 10R to 5YR, value of 4 or 5, and chroma of 6 to 8. It is mottled in shades of brown or yellow. It is clay loam, sandy clay loam, loam, fine sandy loam, or sandy loam.

Pactolus Series

The Pactolus series consists of moderately well drained and somewhat poorly drained, rapidly permeable soils that formed in coarse textured Coastal Plain sediments. These soils are on terraces. Slopes range from 0 to 2 percent.

Typical pedon of Pactolus loamy sand, rarely flooded; 3.0 miles south of Lillington on U.S. Highway 401, west 1.0 mile on Secondary Road 2034, east 0.25 mile on a farm road, northwest 400 feet, in a field:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loamy sand; weak medium granular structure; very

friable; many fine and medium roots; strongly acid; abrupt smooth boundary.
C1—10 to 24 inches; yellowish brown (10YR 5/4) loamy sand; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.
C2—24 to 32 inches; brownish yellow (10YR 6/6) sand; single grained; loose; very strongly acid; gradual smooth boundary.
Cg1—32 to 50 inches; light brownish gray (10YR 6/2) sand; single grained; loose; very strongly acid; gradual smooth boundary.
Cg2—50 to 70 inches; light gray (10YR 7/2) sand; single grained; loose; strongly acid.

The underlying sandy layers extend to a depth of more than 80 inches. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is sand, loamy sand, fine sand, or loamy fine sand.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 1 or 2. It is sand, loamy sand, fine sand, or loamy fine sand.

Pocalla Series

The Pocalla series consists of somewhat excessively drained soils that formed in sandy and loamy Coastal Plain sediments. These soils are moderately rapidly permeable in the upper part and moderately permeable in the lower part. They are on uplands. Slopes range from 0 to 6 percent.

Typical pedon of Pocalla loamy sand, 0 to 6 percent slopes; about 1.0 mile west of Lillington on Secondary Road 1291, west 0.25 mile from the intersection of Secondary Road 1291 and Secondary Road 1229, about 600 feet north on an old airstrip, about 50 feet west of the airstrip, in a field:

Ap—0 to 10 inches; grayish brown (10YR 5/2) loamy sand; very weak medium granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.
E—10 to 21 inches; very pale brown (10YR 7/3) loamy sand; weak medium granular structure; very friable; few fine roots; strongly acid; clear smooth boundary.
Bt—21 to 34 inches; brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; strongly acid; clear wavy boundary.
E′—34 to 54 inches; very pale brown (10YR 7/3) loamy sand; single grained; loose; strongly acid; clear wavy boundary.
Btv—54 to 85 inches; yellowish brown (10YR 5/6) sandy clay loam that has pockets of sandy loam; common medium distinct light gray (10YR 7/1) and yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; friable, slightly sticky and slightly plastic; about 10 percent plinthite; strongly acid.

The solum is 72 inches or more thick. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. The E horizon has hue of 10YR, value of 5 to 7, and chroma of 3 to 8. It is sand or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8.

The E′ horizon has hue of 10YR or 2.5Y, value of 5 to 8, and chroma of 2 to 8. It is sand or loamy sand.

The Btv horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 8 and has mottles in shades of red, brown, yellow, or gray. It contains 5 to 20 percent plinthite. It is sandy clay loam or sandy loam.

Polawana Series

The Polawana series consists of very poorly drained, rapidly permeable soils that formed in sandy marine sediments. These soils are on the lower parts of stream terraces. Slopes range from 0 to 2 percent.

Typical pedon of Polawana loamy sand, frequently flooded; about 13.0 miles south of Lillington on North Carolina Highway 210, east 2.6 miles on Secondary Road 2050, north 0.1 mile on Secondary Road 2049, about 100 feet east of the road, in a pasture:

Ap—0 to 10 inches; black (10YR 2.5/1) loamy sand; weak medium granular structure; very friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.
A1—10 to 15 inches; very dark grayish brown (10YR 3/2) fine sand; weak medium granular structure; very friable; common fine and medium roots; very strongly acid; abrupt smooth boundary.
A2—15 to 27 inches; dark reddish brown (5YR 3/2) fine sand; weak medium granular structure; very friable; few fine roots; very strongly acid; abrupt smooth boundary.
C1—27 to 42 inches; dark reddish brown (7.5YR 4/2) fine sand; loose; very strongly acid; abrupt smooth boundary.

C2—42 to 62 inches; dark brown (7.5YR 4/4) fine sand; loose; clean white coarse sand grains; slightly acid.

Sandy layers extend to a depth of more than 80 inches. Reaction is very strongly acid to neutral.

The Ap horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2 or 3.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2 or is neutral in hue and has value of 2 or 3. It is fine sand, loamy fine sand, sand, or loamy sand.

The C or Cg horizon has hue of 7.5YR to 2.5Y, value of 3 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 3 to 7. It is fine sand, loamy fine sand, sand, or loamy sand.

Portsmouth Series

The Portsmouth series consists of very poorly drained soils that formed in loamy Coastal Plain sediments. These soils are moderately permeable in the upper part and rapidly or very rapidly permeable in the lower part. They are on low stream terraces. Slopes range from 0 to 2 percent.

Typical pedon of Portsmouth loam, rarely flooded; about 11.8 miles south of Lillington on North Carolina Highway 210, east 1.3 miles on Secondary Road 2048, about 0.4 mile south on Secondary Road 2049, about 150 feet east of the road, in a wooded area:

Oe—1 inch to 0; partly decomposed pine and sweetgum forest litter.

A—0 to 22 inches; black (10YR 2/1) loam; moderate medium granular structure; friable; many medium and coarse roots; very strongly acid; abrupt smooth boundary.

Btg—22 to 38 inches; light brownish gray (10YR 6/2) sandy clay loam; common medium distinct dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; friable; few medium roots; few patchy clay films; very strongly acid; clear wavy boundary.

2Cg—38 to 72 inches; gray (10YR 5/1) sand; single grained; loose; very strongly acid.

The solum is 24 to 40 inches thick. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3 or is neutral in hue and has value of 2 or 3. The Eg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or loam.

The BEg horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or loam.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, yellow, or gray. It is sandy clay loam, loam, or clay loam.

The BCg horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, yellow, or gray. It is loamy sand or sandy loam.

The 2Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2. It is mottled in shades of brown or yellow. It is sand or loamy sand.

Rains Series

The Rains series consists of poorly drained, moderately permeable soils that formed in loamy Coastal Plain sediments. These soils are in depressions and broad upland areas. Slopes range from 0 to 2 percent.

Typical pedon of Rains sandy loam; about 2.0 miles north of Dunn on Secondary Road 1715, north 0.8 mile of the intersection of Secondary Roads 1705 and 1715, about 25 feet east of Secondary Road 1715:

Ap—0 to 10 inches; dark gray (10YR 4/1) sandy loam; weak medium granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

Btg1—10 to 18 inches; gray (10YR 6/1) sandy clay loam that has pockets of sandy loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable, slightly sticky; few discontinuous clay films on faces of peds and in pores; few fine roots; moderately acid; clear smooth boundary.

Btg2—18 to 30 inches; gray (10YR 6/1) sandy clay loam that has pockets of sandy loam; common medium faint very pale brown (10YR 7/3) mottles; weak coarse subangular blocky structure; friable, slightly sticky; few discontinuous clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

Btg3—30 to 64 inches; gray (10YR 6/1) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few discontinuous clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

Cg—64 to 72 inches; light gray (10YR 7/1) sandy loam that has pockets of loamy sand; massive; very friable; strongly acid.

The solum is 60 to more than 100 inches thick. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 or 2 or is neutral in hue and has value of 2 to 5. The E horizon, if it occurs, has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is loam, very fine sandy loam, fine sandy loam, sandy loam, or loamy fine sand.

The Btg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. It is mottled in shades of brown or yellow. It is sandy clay loam or clay loam.

The BCg horizon, if it occurs, has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of brown or yellow. It is sandy loam, fine sandy loam, sandy clay loam, or clay loam.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. It is mottled in shades of brown or yellow. It is loamy sand, sandy loam, fine sandy loam, sandy clay loam, clay loam, or sandy clay.

Roanoke Series

The Roanoke series consists of poorly drained, slowly permeable soils that formed in clayey alluvial sediments. These soils are on low flats and in depressions or drainageways along the Cape Fear River and its major tributaries. Slopes range from 0 to 2 percent.

Typical pedon of Roanoke loam, occasionally flooded; about 1.0 mile west of Erwin on North Carolina Highway 217, west 0.1 mile on Secondary Road 1779, about 50 feet west of the road:

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam; weak fine granular structure; friable; strongly acid; abrupt smooth boundary.

BA—7 to 12 inches; grayish brown (10YR 5/2) loam; weak fine subangular blocky structure; friable; strongly acid; clear wavy boundary.

Btg—12 to 40 inches; grayish brown (10YR 5/2) clay loam; common fine prominent strong brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; common fine flakes of mica; few patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

BCg—40 to 46 inches; light gray (10YR 6/1) clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; common flakes of mica; very strongly acid; gradual wavy boundary.

Cg—46 to 60 inches; light gray (10YR 7/1) loamy sand; very friable; few fine and medium pebbles; common flakes of mica; very strongly acid.

The solum is 40 to 60 inches thick. The content of coarse fragments, which are mostly quartz pebbles, ranges from 0 to 10 percent. The content of flakes of mica ranges from 2 to 20 percent in the Btg and C horizons. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2.

The BA horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is loam or clay loam.

The Btg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, or yellow. It is clay loam, silty clay loam, or clay.

The BCg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, or yellow. It is clay loam, silty clay loam, or sandy clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, or yellow. It is sand, loamy sand, sandy loam, clay loam, sandy clay loam, sandy clay, or clay. Some pedons are stratified with sandy, loamy, or clayey material.

State Series

The State series consists of well drained, moderately permeable soils that formed in loamy marine and fluvial sediments. These soils are on low terraces. Slopes range from 0 to 3 percent.

Typical pedon of State fine sandy loam, 0 to 3 percent slopes, rarely flooded; about 10.2 miles west of Lillington on North Carolina Highway 27, about 300 feet south of the highway, about 100 feet east of Secondary Road 1117:

Ap—0 to 7 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

BA—7 to 10 inches; light yellowish brown (10YR 6/4) fine sandy loam; weak medium subangular blocky structure; friable; many fine roots; strongly acid; gradual wavy boundary.

Bt1—10 to 24 inches; yellowish brown (10YR 5/8) clay loam; weak medium subangular blocky structure; firm; many fine roots; common fine flakes of mica;

few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

Bt2—24 to 30 inches; brownish yellow (10YR 6/6) clay loam; weak medium subangular blocky structure; firm; few fine roots; common fine flakes of mica; few patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.

BC—30 to 40 inches; brownish yellow (10YR 6/6) sandy loam; few fine faint very pale brown (10YR 7/4) mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; very strongly acid; gradual wavy boundary.

C1—40 to 48 inches; yellowish brown (10YR 5/6) loamy sand that has pockets of sandy loam; common medium distinct light gray (10YR 7/1) mottles; friable; many flakes of mica; very strongly acid; gradual wavy boundary.

C2—48 to 60 inches; reddish yellow (7.5YR 6/8) loamy sand; friable; about 5 percent fine quartz pebbles; very strongly acid.

The solum is 30 to 60 inches thick. The content of coarse fragments, which are mostly quartz pebbles, ranges from 0 to 25 percent in the C horizon. Reaction ranges from extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6. The E horizon, if it occurs, has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8. It is loamy sand, loamy fine sand, sand, loam, or fine sandy loam.

The BA horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, loam, or sandy clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam, clay loam, or loam.

The BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8 or is mottled in shades of these colors. It is sand, loamy sand, and sandy loam.

Toisnot Series

The Toisnot series consists of poorly drained, slowly permeable soils that formed in loamy Coastal Plain sediments. These soils are in shallow depressions around the head of drainageways and on the outer fringe of stream terraces. Slopes range from 0 to 2 percent.

Typical pedon of Toisnot loam; about 2.0 miles northeast of Dunn on U.S. Highway 301, east 1.0 mile on Secondary Road 1810 , about 400 feet northeast of the road from its intersect ion with Secondary Road 1805:

A—0 to 8 inches; black (1 0YR 2/1) loam; weak medium granular structure; friable; many medium roots; very strongly acid; clear smooth boundary.

Eg—8 to 18 inches; gray (10YR 5/1) loamy sand; weak medium granular structure; friable; common medium roots; very strongly acid; clear smooth boundary.

Bt/E—18 to 30 inches; light brownish gray (10YR 6/2) sandy loam (Bt part) and gray (10YR 6/1) loamy sand (E part); weak medium subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Ex—30 to 38 inches; light gray (10YR 7/1) loamy sand; common medium distinct yellow (10YR 7/8) mottles; massive; very firm, brittle; strongly acid; gradual wavy boundary.

2Cg—38 to 60 inches; light gray (10YR 7/1) sandy loam; common fine distinct yellow (10YR 7/6) mottles; massive; very firm; strongly acid.

The solum is 40 to more than 60 inches thick. Depth to the fragipan (Ex horizon) ranges from 20 to 40 inches. Reaction is very strongly acid or strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2 or is neutral in hue and has value of 2 or 3. The Eg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 6 or 7. It is sand, loamy sand, sandy loam, or silt loam.

The Bt/E horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The Bt part is sandy loam, fine sandy loam, or silt loam. The E part is sand or loamy sand.

The Ex horizon has hue of 10YR, value of 7, and chroma of 1 or 2. It is fine sandy loam, loamy sand, sandy loam, or loamy fine sand.

The 2Cg horizon is gray or is mottled in shades of gray, yellow, or brown. It is loamy sand, sandy loam, clay loam, sandy clay loam, sandy clay, or gravelly loamy sand. In some pedons it is stratified with these textures.

Vaucluse Series

The Vaucluse series consists of well drained soils that formed in loamy Coastal Plain sediments. These soils are moderately slowly permeable in the upper part and slowly permeable in the lower part. They are on convex upland ridges and side slopes. Slopes range from 2 to 25 percent.

Typical pedon of Vaucluse loamy sand, 2 to 8

percent slopes; about 8.0 miles southwest of Lillington on North Carolina Highway 27, about 3.6 miles south on Secondary Road 1117, about 50 feet east of the intersection of Secondary Roads 1117 and 1116:

A—0 to 3 inches; dark brown (10YR 4/3) loamy sand; weak medium granular structure; very friable; very strongly acid; abrupt smooth boundary.
BA—3 to 6 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure; friable; very strongly acid; clear wavy boundary.
Btx1—6 to 16 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; very firm, brittle; few patchy clay films on faces of peds; strongly acid; gradual wavy boundary.
Btx2—16 to 30 inches; yellowish red (5YR 5/8) sandy loam; weak medium subangular blocky structure; very firm, brittle; few flakes of mica; few fine white (10YR 8/1) bodies of kaolin; extremely acid; gradual wavy boundary.
Btx3—30 to 44 inches; strong brown (7.5YR 5/8) sandy loam; common medium distinct yellow (10YR 7/6) mottles; weak medium subangular blocky structure; very firm, brittle; common bodies of gray clay; extremely acid; gradual wavy boundary.
Cx—44 to 60 inches; brownish yellow (10YR 6/6) stratified sand and loamy sand; common coarse distinct strong brown (7.5YR 5/8) mottles; massive; very firm; extremely acid.

The solum is 40 to more than 75 inches thick. Depth to the very firm, brittle horizon ranges from 15 to 35 inches. The content of coarse fragments, which are mostly quartz pebbles, ranges from 0 to 10 percent. Reaction is extremely acid to strongly acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The E horizon, if it occurs, has hue of 10YR, value of 5 or 6, and chroma of 3 to 6. It is loamy sand or gravelly loamy sand.

The BA horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It is loamy sand or sandy loam.

The Btx horizon has hue of 2.5YR to 7.5YR, value of 4 to 7, and chroma of 6 to 8. In the lower part, it has mottles in shades of red, brown, yellow, or gray. It is sandy loam or sandy clay loam.

The BCx horizon, if it occurs, has hue of 2.5YR to 7.5YR, value of 4 to 7, and chroma of 6 to 8. It is mottled in shades of red, brown, yellow, or gray. It is sandy loam, sandy clay loam, or loamy sand.

The Cx horizon has hue of 2.5YR to 7.5YR, value of 4 to 7, and chroma of 6 to 8 or is multicolored. It is mottled in shades of red, brown, yellow, or gray. It is sandy loam, sandy clay loam, or loamy sand and may be stratified with sandy, loamy, or clayey material.

Wagram Series

The Wagram series consists of well drained, moderately permeable soils that formed in loamy Coastal Plain sediments. These soils are on broad upland ridges and side slopes. Slopes range from 0 to 10 percent.

Typical pedon of Wagram loamy sand, 0 to 6 percent slopes; about 1.5 miles north of Lillington on North Carolina Highway 210, about 0.3 mile north of the intersection of North Carolina Highway 210 and U.S. Highway 421, about 50 feet east of a power station:

Ap—0 to 10 inches; brown (10YR 5/3) loamy sand; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt smooth boundary.
E—10 to 29 inches; very pale brown (10YR 7/4) loamy sand; weak fine granular structure; very friable; common fine and medium roots; slightly acid; abrupt smooth boundary.
BE—29 to 34 inches; brownish yellow (10YR 6/6) sandy loam; weak fine subangular blocky structure; very friable; common fine roots; moderately acid; clear smooth boundary.
Bt1—34 to 44 inches; brownish yellow (10YR 6/6) sandy clay loam; common medium faint strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine roots; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt2—44 to 60 inches; strong brown (7.5YR 5/6) sandy clay loam; many coarse faint light yellowish brown (10YR 6/4) and common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few patchy clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt3—60 to 72 inches; mottled brown (7.5YR 5/6), light gray (10YR 7/1), and red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.
BC—72 to 80 inches; brownish yellow (10YR 6/8) sandy loam; many coarse prominent light gray (10YR 7/1) mottles; massive; friable; very strongly acid.

The solum is 60 inches or more thick. Reaction is very strongly acid to moderately acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is loamy sand, loamy fine sand, sand, or fine sand.

The BE horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 6. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 6 to 8. It is mottled in shades of red, brown, or yellow. It is sandy clay loam or sandy loam.

The BC horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8 or is mottled in shades of these colors. It is sandy clay loam or sandy loam.

Wahee Series

The Wahee series consists of somewhat poorly drained, slowly permeable soils that formed in clayey sediments. These soils are on low terraces. Slopes range from 0 to 2 percent.

Typical pedon of Wahee fine sandy loam, occasionally flooded; about 0.25 mile north of Bunnlevel to the intersection of U.S. Highway 401 and Secondary Road 2022, west 2.0 miles on Secondary Road 2072, north 0.2 mile on a farm road, about 100 feet west of the road:

Ap—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; slightly acid; abrupt smooth boundary.

E—8 to 10 inches; pale brown (10YR 6/3) fine sandy loam; weak medium granular structure; very friable; few fine and medium roots; strongly acid; clear wavy boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/6) clay; few fine distinct light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm; few patchy clay films on faces of peds; few medium flakes of mica; very strongly acid; clear wavy boundary.

Bt2—18 to 26 inches; yellowish brown (10YR 5/6) clay; common fine distinct light gray (10YR 7/1) and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few patchy clay films on faces of peds; common medium flakes of mica; very strongly acid; clear wavy boundary.

Btg—26 to 39 inches; light gray (10YR 7/1) clay; common medium distinct very pale brown (10YR 7/3) and common medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few patchy clay films on faces of peds; many fine and medium flakes of mica; very strongly acid; clear wavy boundary.

BCg—39 to 45 inches; light gray (10YR 5/1) sandy clay loam; common medium distinct very pale brown (10YR 7/3) and few medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; many fine and medium flakes of mica; very strongly acid; clear wavy boundary.

Cg—45 to 62 inches; light gray (10YR 7/1) coarse loamy sand that has pockets of sandy clay loam; single grained; loose; many fine and medium flakes of mica; very strongly acid.

The solum is 40 to more than 60 inches thick. Reaction ranges from very strongly acid to moderately acid in A and E horizons, except where limed, and from extremely acid to strongly acid in the B and C horizons.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 to 5, and chroma of 1 to 3 or is neutral in hue and has value of 3 to 5. The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. It is loam, fine sandy loam, or sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 8. It is mottled in shades of red, brown, yellow, or gray. It is clay, sandy clay, clay loam, or silty clay.

The BCg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. It is mottled in shades of red, brown, yellow, or gray. It is sandy clay, silty clay loam, clay loam, sandy clay loam, or fine sandy loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 5 to 7. It is mottled in shades of red, brown, yellow, or gray. It is sand, loamy sand, coarse loamy sand, or sandy loam.

Wakulla Series

The Wakulla series consists of somewhat excessively drained, rapidly permeable soils on broad sandhill ridges in the uplands. Slopes range from 0 to 8 percent.

Typical pedon of Wakulla sand, 0 to 8 percent slopes; about 0.75 mile west of Spout Springs on North Carolina Highway 24, about 0.3 mile west of Spout Springs United Presbyterian Church, about 200 feet north of the highway:

A—0 to 4 inches; brown and dark brown (10YR 4/3) sand; single grained; very friable; common fine roots; strongly acid; clear smooth boundary.

E—4 to 11 inches; brownish yellow (10YR 6/6) sand; single grained; loose; common fine roots; strongly acid; gradual smooth boundary.

Bt—11 to 36 inches; yellowish brown (10YR 5/8) loamy sand; weak medium subangular blocky structure; very friable; common fine roots; about 75 percent sand grains bridged with clay; strongly acid; gradual smooth boundary.
C1—36 to 54 inches; brownish yellow (10YR 6/8) sand that has many thin (1 centimeter) lamellae of strong brown (7.5YR 5/6) sandy loam; single grained; loose; few fine roots; strongly acid; gradual smooth boundary.
C2—54 to 96 inches; reddish yellow (7.5YR 7/6) sand; single grained; loose; strongly acid.

The solum is 28 to 60 inches thick. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed.

The A or Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The E horizon has hue of 10YR, value of 4 to 7, and chroma of 4 to 8. It is sand, loamy sand, fine sand, or loamy fine sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 6 to 8.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 6 to 8. It is sand, fine sand, or coarse sand.

Wehadkee Series

The Wehadkee series consists of poorly drained, moderately permeable soils that formed in loamy sediments washed from soils that formed in material weathered from felsic crystalline rock. These soils are on flood plains. Slopes range from 0 to 2 percent.

Typical pedon of Wehadkee loam, frequently flooded; about 6.4 miles north of Lillington at Hector Creek bridge and Secondary Road 1412, about 100 feet south of the road, 100 feet east of Hector Creek:

A—0 to 6 inches; brown (7.5YR 4/2) loam; weak medium granular structure; friable; many medium and coarse roots; common fine flakes of mica; very strongly acid; abrupt smooth boundary.
Bg1—6 to 18 inches; gray (10YR 5/1) silt loam that has pockets of sand; weak fine subangular blocky structure; friable; many fine and medium roots; many fine flakes of mica; very strongly acid; clear smooth boundary.
Bg2—18 to 24 inches; light gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; many fine roots; many fine flakes of mica; very strongly acid; clear smooth boundary.
Bg3—24 to 40 inches; gray (10YR 6/1) silty clay loam; common medium distinct yellowish brown (7.5YR 5/6) mottles; weak fine subangular blocky structure; firm; few fine roots; many fine flakes of mica; very strongly acid; clear smooth boundary.
Cg1—40 to 72 inches; yellow (10YR 7/6) fine sandy loam; many medium distinct pale brown (10YR 6/3) and light gray (10YR 7/1) mottles; massive; friable; many fine flakes of mica; moderately acid; clear smooth boundary.
Cg2—72 to 80 inches; light gray (10YR 7/1) fine sand; single grained; loose; many fine flakes of mica; moderately acid.

The solum is 20 to more than 60 inches thick. Reaction is very strongly acid to slightly acid, except where the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 4. It is fine sandy loam, loam, or silt loam.

The Bg horizon has hue of 10YR to 5Y, value of 6 or 7, and chroma of 1 or 2. It is mottled in shades of red, brown, or yellow. It is sandy clay loam, silt loam, loam, or silty clay loam.

The Cg horizon has hue of 10YR to 5Y, value of 5 to 7, and chroma of 1 or 2 or is neutral in hue and has value of 4 to 7. It is mottled in shades of red, brown, or yellow. It is fine sandy loam, sandy loam, loamy fine sand, loamy sand, or fine sand and may be stratified with these textures.

Wickham Series

The Wickham series consists of well drained, moderately permeable soils that formed in fluvial and marine sediments. These soils are on stream terraces. Slopes range from 0 to 15 percent.

Typical pedon of Wickham fine sandy loam, 0 to 6 percent slopes, rarely flooded; about 2.0 miles west of Erwin on North Carolina Highway 217 to the intersection of Secondary Road 1779, about 300 feet south on Secondary Road 1779, about 100 feet east of the road:

Ap—0 to 4 inches; dark brown (7.5YR 4/4) fine sandy loam; moderate medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.
Bt1—4 to 19 inches; yellowish red (5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few patchy clay films on faces of peds; few fine roots; moderately acid; clear wavy boundary.
Bt2—19 to 34 inches; yellowish red (5YR 4/8) fine sandy loam; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; few fine roots; few patchy clay films on faces of peds; moderately acid; abrupt wavy boundary.
BC—34 to 38 inches; strong brown (7.5YR 5/6) gravelly

fine sandy loam; weak coarse subangular blocky structure; friable, slightly sticky and slightly plastic; about 30 percent gravel; moderately acid; abrupt wavy boundary.

C1—38 to 49 inches; reddish yellow (7.5YR 6/8) fine sandy loam; many medium distinct yellowish red (5YR 4/8) mottles; massive; friable; moderately acid; clear smooth boundary.

C2—49 to 56 inches; yellowish red (5YR 5/6) sand; single grained; loose; moderately acid; clear smooth boundary.

C3—56 to 72 inches; reddish yellow (7.5YR 6/6) sand; single grained; loose; moderately acid.

The solum is 36 to 60 inches thick. The content of coarse fragments ranges from 0 to 35 percent in the BC or C horizon. Reaction ranges from very strongly acid to moderately acid, except where the surface layer has been limed.

The Ap or A horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 2 to 4.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is sandy clay loam or clay loam.

The BC horizon has hue of 2.5YR to 10YR, value of 4 to 6, and chroma of 6 to 8. It is fine sandy loam, gravelly fine sandy loam, sandy loam, gravelly sandy loam, loamy sand, or gravelly loamy sand.

The C horizon has hue of 5YR or 7.5YR, value of 5 or 6, and chroma of 6 to 8. It is fine sandy loam, gravelly fine sandy loam, sandy loam, gravelly sandy loam, loamy sand, or gravelly loamy sand.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Atterberg limits. Atterberg limits are measured for soil materials passing the No. 40 sieve. They include the liquid limit (LL), which is the moisture content at which the soil passes from a plastic to a liquid state, and the plastic limit (PL), which is the water content corresponding to an arbitrary limit between the plastic and semisolid states of consistency of a soil.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Basic rock. An igneous rock composed dominantly of dark minerals. The minerals of this rock are comparatively low in silica and rich in bases, such as the amphiboles, the pyroxenes, biotite, and olivine.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Carolina bay. A shallow, oval depression that does not have a natural drainage outlet. These bays are oriented in a northwest-southwest direction and range from 5 acres to more than 500 acres in size. Most contain standing water unless they are drained.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey. A general textural term that includes sandy clay, silty clay, and clay. According to family level criteria in the taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) containing 35 percent or more clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

CMAI (cumulative mean annual increment). The age or rotation at which growing stock of a forest produces the greatest annual growth (for that time period). It is the age at which periodic annual

growth and mean annual growth are equal.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Coastal Plain. The physiographic region of eastern North Carolina that consists of ocean-deposited sediments of sand, silt, and clay. These areas of sediments are level to rolling and vary in thickness.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Use of that portion of the plant or crop left in the field after harvest for protection or improvement of the soil.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dbh (diameter at breast height). The diameter of a tree at 4 feet above the ground level on the uphill side.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Delineation. The process of drawing or plotting features on a map with lines and symbols.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth class. Refers to the depth to a root restricting layer. Unless otherwise stated, this layer is understood to be consolidated bedrock. The depth classes in this survey are:

Very shallow	less than 10 inches
Shallow	10 to 20 inches
Moderately deep	20 to 40 inches
Deep	40 to 60 inches
Very deep	more than 60 inches

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are

commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material to eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Erosion classes. Classes based on estimates of past erosion. The classes are as follows:

Class 1.—Soils that have lost some of the original A horizon but on the average less than 25 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most of the area, the thickness of the surface layer is within the normal range of variability of the uneroded soil. Class 1 erosion typically is not designated in the name of the map unit or in the map symbol.

Class 2.—Soils that have lost an average of 25 to 75 percent of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). Throughout most cultivated areas of class 2 erosion, the surface layer consists of a mixture of the original A horizon and material from below. Some areas may have intricate patterns ranging from uneroded spots to spots where all of the original A horizon has been removed.

Class 3.—Soils that have lost an average of 75 percent or more of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick). In most areas of class 3 erosion, material that was below the original A horizon is exposed. The plow layer consists entirely or largely of this material.

Class 4.—Soils that have lost all of the original A horizon or of the uppermost 8 inches (if the original A horizon was less than 8 inches thick) plus some or all of the deeper horizons throughout most of the area. The original soil can be identified only in spots. Some areas may be smooth, but

most have an intricate pattern of gullies.

Erosion hazard. Terms describing the potential for future erosion, inherent in the soil itself, in inadequately protected areas. The following definitions are based on estimated annual soil loss in tons per acre (values determined by the Universal Soil Loss Equation assuming bare soil conditions and using rainfall and climate factors for North Carolina):

0 tons per acre	None
Less than 1 ton per acre	Slight
1 to 5 tons per acre	Moderate
5 to 10 tons per acre	Severe
More than 10 tons per acre	Very severe

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Evapotranspiration. The combined loss of water from a given area through surface evaporation and through transpiration by plants during a specified period of time.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Felsic rock. A general term for light colored igneous rock and some metamorphic crystalline rock.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flooding. The temporary covering of the surface by flowing water from any source, such as overflowing streams, runoff from adjacent or surrounding slopes, and inflow from high tides. The frequency of flooding generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The duration of flooding is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month).

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forest type. A classification of forest land based on the species forming the majority of live-tree stocking.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Geomorphic surface. A part of the surface of the land that has definite geographic boundaries and is formed by one or more agencies during a given time span.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or

layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.
A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.
E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.
Cr horizon.—Soft, consolidated bedrock beneath the soil.
R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification of molten rock, generally crystalline in nature.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intermediate rock. Igneous or metamorphic crystalline rock that is intermediate in composition between mafic and felsic rock.

Interstream area. The nearly level land between drainageways in relatively undissected parts of the Coastal Plain. It is in areas on uplands, low marine terraces, and stream terraces. Soils in these areas are generally poorly drained or very poorly drained.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a

strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lamellae (soils). Very thin, mostly horizontal layers of accumulated clay, iron, or other materials common in some sands or loamy sands; associated with soil formation rather than geologic deposition.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of loamy very fine sand or finer textured material that contains less than 35 percent clay, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Low strength. The soil is not strong enough to support loads.

Mafic rock. A dark rock composed predominantly of magnesium silicates. It contains little quartz, feldspar, or muscovite mica.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

No-till planting. A method of planting crops in which there is virtually no seedbed preparation. A thin slice of the soil is opened, and the seed is planted at the desired depth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Overstory. The portion of the trees in a forest stand forming the upper crown cover.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piedmont. The physiographic region of central North Carolina characterized by rolling landscapes formed from the weathering of residual rock material.

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	below 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated

erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Roadcut. A sloping surface made by mechanical means during road construction. It is generally on the uphill section of a road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Runoff class (surface). Refers to the rate at which water flows away from the soil over the surface without infiltrating. Six classes of rate of runoff are recognized:

Ponded.—Little of the precipitation and water that runs onto the soil escapes as runoff, and free water stands on the surface for significant periods. The amount of water that is removed from ponded areas by movement through the soil, by plants, or by evaporation is usually greater than the total rainfall. Ponding normally occurs on level and nearly level soils in depressions. The water depth may fluctuate greatly.

Very slow.—Surface water flows away slowly, and free water stands on the surface for long periods or immediately enters the soil. Most of the water passes through the soil, is used by plants, or evaporates. The soils are commonly level or nearly level or are very open and porous.

Slow.—Surface water flows away so slowly that free water stands on the surface for moderate periods or enters the soil rapidly. Most of the water passes through the soil, is used by plants, or evaporates. The soils are nearly level or very gently sloping, or they are steeper but absorb precipitation very rapidly.

Medium.—Surface water flows away so rapidly that free water stands on the surface for only short periods. Part of the precipitation enters the soil and is used by plants, is lost by evaporation, or moves into underground channels. The soils are nearly level or gently sloping and absorb precipitation at a moderate rate, or they are steeper but absorb water rapidly.

Rapid.—Surface water flows away so rapidly that the period of concentration is brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly moderately steep or steep and have moderate or slow rates of absorption.

Very rapid.—Surface water flows away so rapidly that the period of concentration is very brief and free water does not stand on the surface. Only a small part of the water enters the soil. The soils are mainly steep or very steep and absorb precipitation slowly.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandy. A general textural term that includes coarse sand, sand, fine sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand. According to family level criteria in the soil taxonomic system, a specific textural name referring to fine earth (particles less than 2 millimeters in size) of sand or loamy sand that contains less than 50 percent very fine sand, by weight, within the control section. The content of rock fragments is less than 35 percent, by volume.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that

range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey area slope classes are generally as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil compaction. An alteration of soil structure that ultimately can affect the biological and chemical properties of the soil. Soil compaction decreases the extent of voids and increases bulk density.

Soil map unit. A kind of soil or miscellaneous area or a combination of two or more soils or one or more soils and one or more miscellaneous areas that can be shown at the scale of mapping for the defined purposes and objectives of the soil survey. They are generally designed to reflect significant differences in use and management.

Soil puddling. This condition occurs in certain soils when they are driven over while they are wet. Exertion of mechanical force destroys the soil structure by compressing and shearing and results in the rearrangement of the soil particles to a massive or nonstructural state.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Soil strength. Load supporting capacity of a soil at specific moisture and density conditions.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Suitability ratings. Ratings for the degree of suitability of soils for pasture, crops, woodland, and engineering uses. The ratings and the general criteria used for their selection are as follows:
Well suited.—The intended use may be initiated

and maintained by using only the standard materials and methods typically required for that use. Good results can be expected.

Moderately suited.—The limitations affecting the intended use make special planning, design, or maintenance necessary.

Poorly suited.—The intended use is difficult or costly to initiate and maintain because of certain soil properties, such as steep slopes, a high hazard of erosion, a high water table, low fertility, or a hazard of flooding. Major soil reclamation, special design, or intensive management practices are needed.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine." The textural classes are defined as follows:

Sands (coarse sand, sand, fine sand, and very fine sand).—Soil material in which the content of sand is 85 or more percent and the percentage of silt plus 1.5 times the percentage of clay does not exceed 15.

Loamy sands (loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand).—Soil material in which, at the upper limit, the content of sand is 85 to 90 percent and the percentage of silt plus 1.5 times the percentage of clay is not less than 15; at the lower limit, the content of sand is 70 to 85 percent, and the percentage of silt plus twice the percentage of clay does not exceed 30.

Sandy loams (coarse sandy loam, sandy loam, fine sandy loam, and very fine sandy loam).—Soil material in which the content of clay is 20 percent or less, the percentage of silt plus twice the percentage of clay exceeds 30, and the content of sand is 52 percent or more or soil material in which the content of clay is less than 7 percent, the content of silt is less than 50 percent, and the content of sand is 43 and 52 percent.

Loam.—Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Silt loam.—Soil material that contains 50 or more percent silt and 12 to 27 percent clay or 50 to 80 percent silt and less than 12 percent clay.

Silt.—Soil material that contains 80 or more percent silt and less than 12 percent clay.

Sandy clay loam.—Soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 or more percent sand.

Clay loam.—Soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

Silty clay loam.—Soil material that contains 27 to 40 percent clay and less than 20 percent sand.

Sandy clay.—Soil material that contains 35 or more percent clay and 45 or more percent sand.

Silty clay.—Soil material that contains 40 or more percent clay and 40 or more percent silt.

Clay.—Soil material that contains 40 or more percent clay, less than 45 percent sand, and less than 40 percent silt.

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topography. The relative positions and elevations of the natural or manmade features of an area that describe the configuration of its surface.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Underlying material. Technically the C horizon; the part of the soil below the biologically altered A and B horizons.

Understory. The trees and other woody species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Universal Soil Loss Equation. An equation used to design water erosion control systems. The equation is A=RKLSPC wherein A is the average annual soil loss in tons per acre per year, R is the rainfall factor, K is the soil erodibility factor,

L is the length of slope, S is the steepness of slope, P is the conservation practice factor, and C is the cropping and management factor.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors that are assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water table (apparent). A thick zone of free water in the soil. The apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table (perched). A saturated zone of water in the soil standing above an unsaturated zone.

Water table (seasonal high). The highest level of a saturated zone in the soil (the apparent or perched water table) over a continuous period of more than 2 weeks in most years, but not a permanent water table.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wetness. A general term applied to soils that hold water at or near the surface long enough to be a common management problem.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Yield (forest land). The volume of wood fiber from harvested trees taken from a certain unit of area. It is usually measured in board feet or cubic feet per acre.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1962-78 at Dunn, North Carolina)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	51.2	29.6	40.4	76	6	73	3.59	2.69	4.42	7	1.6
February	54.9	31.7	43.3	76	10	25	3.88	1.98	5.53	7	.8
March	65.4	40.6	53.0	85	21	143	4.09	2.17	5.77	8	.0
April	75.0	48.6	61.8	89	30	354	3.15	1.28	4.72	6	.0
May	80.4	56.1	68.3	95	37	567	3.97	2.22	5.52	7	.0
June	85.8	64.0	74.9	98	49	747	4.70	2.06	6.95	8	.0
July	88.6	67.3	77.9	97	56	865	5.16	2.56	7.41	9	.0
August	87.5	66.4	76.7	97	53	828	5.17	2.91	7.16	9	.0
September	83.1	59.7	71.4	94	39	642	3.56	1.07	5.57	5	.0
October	74.0	48.3	61.2	87	25	353	2.89	.69	4.61	4	.0
November	63.9	38.9	51.4	81	19	132	3.17	1.20	4.81	4	.0
December	55.1	32.5	43.8	76	13	51	3.89	1.84	5.65	7	.0
Yearly:											
Average	72.1	48.6	60.3	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	6	---	---	---	---	---	---
Total	---	---	---	---	---	4,780	47.22	38.60	53.99	81	2.4

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1962-78 at Dunn, North Carolina)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 22	Apr. 7	Apr. 16
2 years in 10 later than--	Mar. 17	Apr. 2	Apr. 12
5 years in 10 later than--	Mar. 5	Mar. 23	Apr. 3
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 29	Oct. 20	Oct. 11
2 years in 10 earlier than--	Nov. 5	Oct. 26	Oct. 15
5 years in 10 earlier than--	Nov. 18	Nov. 5	Oct. 22

TABLE 3.--GROWING SEASON

(Recorded in the period 1962-78 at Dunn, North Carolina)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	233	203	184
8 years in 10	241	211	190
5 years in 10	257	226	201
2 years in 10	273	240	212
1 year in 10	282	248	218

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AnB	Alpin sand, 0 to 6 percent slopes	1,350	0.4
AtA	Altavista fine sandy loam, 0 to 3 percent slopes, rarely flooded	5,368	1.4
Au	Augusta fine sandy loam, rarely flooded	2,520	0.7
AyA	Aycock silt loam, 0 to 2 percent slopes	1,436	0.4
AyB	Aycock silt loam, 2 to 6 percent slopes	1,221	0.3
Bb	Bibb loam, frequently flooded	22,451	5.8
BnB	Blaney loamy sand, 2 to 8 percent slopes	30,362	7.9
BnD	Blaney loamy sand, 8 to 15 percent slopes	8,214	2.1
CaB	Candor sand, 0 to 8 percent slopes	11,209	2.9
CaD	Candor sand, 8 to 15 percent slopes	1,632	0.4
CeB	Cecil fine sandy loam, 2 to 8 percent slopes	13,977	3.6
CeD	Cecil fine sandy loam, 8 to 15 percent slopes	18,293	4.7
Ch	Chewacla and Congaree loams, frequently flooded	3,748	1.0
Co	Coxville loam	2,713	0.7
DoA	Dothan loamy sand, 0 to 2 percent slopes	5,534	1.4
DoB	Dothan loamy sand, 2 to 6 percent slopes	16,871	4.4
DtB	Dothan gravelly loamy sand, 0 to 6 percent slopes	2,088	0.5
DyF	Dystrochrepts, steep	510	0.1
EnB	Enon fine sandy loam, 2 to 8 percent slopes	241	0.1
EnD	Enon fine sandy loam, 8 to 15 percent slopes	258	0.1
ExA	Exum very fine sandy loam, 0 to 2 percent slopes	3,088	0.8
FaB	Fuquay loamy sand, 0 to 6 percent slopes	17,989	4.7
FuB	Fuquay gravelly loamy sand, 0 to 6 percent slopes	1,808	0.5
GaA	Gilead loamy sand, 0 to 2 percent slopes	858	0.2
GaB	Gilead loamy sand, 2 to 8 percent slopes	37,219	9.7
GaD	Gilead loamy sand, 8 to 15 percent slopes	8,077	2.1
GoA	Goldsboro loamy sand, 0 to 2 percent slopes	5,072	1.3
Gr	Grantham loam	1,942	0.5
HaB	Helena fine sandy loam, 2 to 8 percent slopes	253	0.1
LaB	Lakeland sand, 0 to 8 percent slopes	4,624	1.2
LnB	Lillington very gravelly sandy loam, 2 to 8 percent slopes	3,611	0.9
LnD	Lillington very gravelly sandy loam, 8 to 15 percent slopes	3,062	0.8
LnE	Lillington very gravelly sandy loam, 15 to 25 percent slopes	548	0.1
LoF	Louisa fine sandy loam, 25 to 45 percent slopes	2,743	0.7
Ly	Lynchburg sandy loam	2,162	0.6
MaA	Marlboro sandy loam, 0 to 2 percent slopes	3,319	0.9
MaB	Marlboro sandy loam, 2 to 6 percent slopes	1,541	0.4
Na	Nahunta loam	2,671	0.7
NeD	Nason silt loam, 8 to 15 percent slopes	2,658	0.7
NeE	Nason silt loam, 15 to 25 percent slopes	2,420	0.6
NoA	Norfolk loamy sand, 0 to 2 percent slopes	14,507	3.8
NoB	Norfolk loamy sand, 2 to 6 percent slopes	23,387	6.1
NoC	Norfolk loamy sand, 6 to 10 percent slopes	5,624	1.5
NuB	Norfolk-Urban land complex, 0 to 6 percent slopes	1,429	0.4
OrB	Orangeburg loamy sand, 2 to 6 percent slopes	2,817	0.7
PaE	Pacolet fine sandy loam, 15 to 25 percent slopes	8,841	2.3
Pc	Pactolus loamy sand, rarely flooded	671	0.2
Pd	Pits-Dumps complex	3,723	1.0
Pf	Pocalla loamy sand, 0 to 6 percent slopes	2,237	0.6
Pn	Polawana loamy sand, frequently flooded	791	0.2
Ps	Portsmouth loam, rarely flooded	1,228	0.3
Ra	Rains sandy loam	5,347	1.4
Rb	Rains-Urban land complex	407	0.1
Ro	Roanoke loam, occasionally flooded	13,063	3.4
StA	State fine sandy loam, 0 to 3 percent slopes, rarely flooded	3,074	0.8
To	Toisnot loam	473	0.1
VaB	Vaucluse loamy sand, 2 to 8 percent slopes	2,353	0.6
VaD	Vaucluse loamy sand, 8 to 15 percent slopes	2,369	0.6
VeB	Vaucluse gravelly loamy sand, 2 to 8 percent slopes	1,170	0.3
VeD	Vaucluse gravelly loamy sand, 8 to 15 percent slopes	2,377	0.6
VeE	Vaucluse gravelly loamy sand, 15 to 25 percent slopes	479	0.1
WaB	Wagram loamy sand, 0 to 6 percent slopes	6,963	1.8
WaC	Wagram loamy sand, 6 to 10 percent slopes	1,191	0.3
We	Wahee fine sandy loam, occasionally flooded	3,563	0.9
WfB	Wakulla sand, 0 to 8 percent slopes	5,090	1.3

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
Wh	Wehadkee loam, frequently flooded	8,936	2.3
WkB	Wickham fine sandy loam, 0 to 6 percent slopes, rarely flooded	5,864	1.5
WkD	Wickham fine sandy loam, 6 to 15 percent slopes, rarely flooded	1,075	0.3
	Water	256	0.1
	Total	384,966	100.0

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Improved bermudagrass	Grass-legume hay
		Bu	Bu	Lbs	Bu	AUM*	Tons
AnB---- Alpin	IVs	---	---	1,500	---	8.0	4.8
AtA---- Altavista	IIw	125	42	3,000	55	10.0	6.0
Au---- Augusta	IIIw	100	40	2,200	---	---	6.0
AyA---- Aycock	IIe	120	40	2,700	60	10.0	6.0
AyB---- Aycock	IIIe	110	35	2,400	55	9.5	5.7
Bb---- Bibb	Vw	---	---	---	---	---	3.0
BnB---- Blaney	IIIs	60	25	---	30	8.0	4.8
BnD---- Blaney	IVs	50	20	---	30	7.0	4.0
CaB, CaD---- Candor	IVs	40	15	1,300	---	---	3.5
CeB---- Cecil	IIe	95	35	2,100	---	9.0	5.0
CeD---- Cecil	IVe	80	25	1,900	---	8.5	2.8
Ch:							
Chewacla----	IVw	110	40	---	30	10.0	6.0
Congaree----	IIIw	140	40	---	---	10.0	6.0
Co**---- Coxville	IIIw	110	40	---	50	9.0	5.0
DoA---- Dothan	I	120	40	2,800	---	9.5	6.0
DoB---- Dothan	IIe	120	35	2,600	---	9.5	6.0
DtB---- Dothan	IIe	110	32	2,400	---	9.0	5.5
DyF---- Dystrochrepts	VIIe	---	---	---	---	---	---
EnB---- Enon	IIIe	85	30	1,900	40	7.0	5.1

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Improved bermudagrass	Grass-legume hay
		Bu	Bu	Lbs	Bu	AUM*	Tons
EnD---------- Enon	IVe	75	25	1,700	40	---	4.8
ExA---------- Exum	IIw	125	50	3,000	---	10.0	6.6
FaB---------- Fuquay	IIs	85	30	2,400	---	8.5	---
FuB---------- Fuquay	IIs	80	30	2,400	---	8.0	---
GaA---------- Gilead	IIw	85	35	2,200	---	7.0	4.2
GaB---------- Gilead	IIIe	75	35	2,200	---	7.0	4.2
GaD---------- Gilead	VIe	---	---	---	---	5.5	3.3
GoA---------- Goldsboro	IIw	125	42	3,000	60	10.0	6.0
Gr**---------- Grantham	IIIw	125	45	---	---	10.0	6.3
HaB---------- Helena	IIw	85	35	2,000	---	6.5	3.6
LaB---------- Lakeland	IVs	55	20	1,700	---	5.0	2.5
LnB---------- Lillington	IIIs	80	30	2,100	---	6.0	4.0
LnD---------- Lillington	IVs	70	25	1,900	---	6.0	3.5
LnE---------- Lillington	VIs	---	---	---	---	4.5	3.0
LoF---------- Louisa	VIIe	---	---	---	---	---	---
Ly---------- Lynchburg	IIw	125	45	2,800	---	---	5.5
MaA---------- Marlboro	I	110	40	2,500	---	10.0	6.0
MaB---------- Marlboro	IIe	110	40	2,400	---	10.0	6.0
Na---------- Nahunta	IIw	120	45	2,800	---	10.0	6.3
NeD---------- Nason	IIIe	85	30	---	45	5.5	2.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Improved bermudagrass	Grass-legume hay
		Bu	Bu	Lbs	Bu	AUM*	Tons
NeE---------- Nason	IVe	---	---	---	---	---	2.5
NoA---------- Norfolk	I	110	40	3,000	60	9.5	5.5
NoB---------- Norfolk	IIe	100	35	2,900	55	9.5	5.5
NoC---------- Norfolk	IIIe	90	30	2,700	50	9.5	5.5
NuB***:							
Norfolk--------	IIe	100	35	2,900	55	---	---
Urban land-----	VIIIs	---	---	---	---	---	---
OrB---------- Orangeburg	IIe	120	45	2,400	---	10.5	6.0
PaE---------- Pacolet	VIe	---	---	---	---	8.0	5.0
Pc---------- Pactolus	IIIs	65	25	1,800	---	---	2.5
Pd***:							
Pits----------	VIIIs	---	---	---	---	---	---
Dumps----------	VIIIs	---	---	---	---	---	---
Pf---------- Pocalla	IIs	75	30	2,000	---	8.0	5.0
Pn---------- Polawana	VIw	---	---	---	---	---	---
Ps---------- Portsmouth	VIw	---	---	---	---	---	---
Ra---------- Rains	IIIw	120	40	2,000	---	---	2.5
Rb***:							
Rains----------	IIIw	110	40	2,000	---	---	---
Urban land-----	VIIIs	---	---	---	---	---	---
Ro**---------- Roanoke	IIIw	120	40	---	45	---	3.0
StA---------- State	I	130	45	3,000	60	---	10.0
To**---------- Toisnot	IVw	75	25	---	---	---	---
VaB---------- Vaucluse	IIIs	65	25	---	---	8.0	3.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Tobacco	Wheat	Improved bermudagrass	Grass-legume hay
		Bu	Bu	Lbs	Bu	AUM*	Tons
VaD---------- Vaucluse	IVe	55	15	---	---	7.0	4.0
VeB---------- Vaucluse	IIIs	70	25	---	---	8.0	4.5
VeD---------- Vaucluse	IVe	50	15	---	---	7.0	4.0
VeE---------- Vaucluse	VIe	---	---	---	---	7.0	---
WaB---------- Wagram	IIs	75	25	2,200	40	8.0	4.5
WaC---------- Wagram	IIIs	70	20	2,000	30	8.0	4.5
We---------- Wahee	IIw	110	45	---	---	---	---
WfB---------- Wakulla	IIIs	60	25	1,800	---	7.0	2.5
Wh---------- Wehadkee	VIw	---	---	---	---	---	---
WkB---------- Wickham	IIe	115	38	2,600	---	10.0	5.5
WkD---------- Wickham	IVe	85	26	1,900	---	9.5	4.5

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** Yields are for drained conditions. See the map unit description for the capability subclass in undrained areas.

*** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
AnB---------- Alpin	8S	Slight	Moderate	Moderate	Loblolly pine--------	85	120	Loblolly pine.
					Longleaf pine--------	70	79	
					Turkey oak----------	---	---	
					Post oak------------	---	---	
					Blackjack oak--------	---	---	
					Bluejack oak---------	---	---	
AtA---------- Altavista	9A	Slight	Slight	Slight	Loblolly pine--------	91	133	Loblolly pine.
					Longleaf pine--------	87	117	
					White oak----------	77	59	
					Shortleaf pine-------	---	---	
					Sweetgum------------	---	---	
					Red maple-----------	---	---	
					Yellow-poplar--------	---	---	
					Southern red oak-----	---	---	
					Water oak-----------	---	---	
					American beech-------	---	---	
					Hickory-------------	---	---	
Au---------- Augusta	9W	Slight	Moderate	Slight	Loblolly pine--------	90	131	Loblolly pine,
					Sweetgum------------	90	106	sweetgum,
					American sycamore----	90	98	American sycamore,
					White oak----------	80	62	yellow-poplar,
					Southern red oak-----	80	62	cherrybark oak.
					Water oak-----------	---	---	
					Shortleaf pine-------	---	---	
					Red maple-----------	---	---	
					Yellow-poplar--------	---	---	
					American beech-------	---	---	
AyA, AyB---------- Aycock	8A	Slight	Slight	Slight	Loblolly pine--------	84	118	Loblolly pine.
					Longleaf pine--------	60	56	
					Southern red oak-----	---	---	
					White oak----------	---	---	
Bb---------- Bibb	9W	Slight	Severe	Severe	Loblolly pine--------	90	131	Eastern cottonwood,
					Sweetgum------------	90	106	loblolly pine,
					Water oak-----------	90	86	sweetgum, yellow-
					Blackgum------------	---	---	poplar.
					Yellow-poplar--------	---	---	
					Atlantic white cedar-	---	---	
BnB, BnD---------- Blaney	7S	Slight	Moderate	Moderate	Loblolly pine--------	76	103	Longleaf pine.
					Longleaf pine--------	66	70	
CaB, CaD---------- Candor	4S	Slight	Moderate	Moderate	Longleaf pine--------	58	52	Longleaf pine,
					Loblolly pine--------	---	---	loblolly pine.
					Turkey oak----------	---	---	
					Blackjack oak--------	---	---	
					Post oak------------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
CeB, CeD---------- Cecil	8A	Slight	Slight	Slight	Loblolly pine--------	83	116	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	69	108	
					Virginia pine--------	71	110	
					White oak------------	79	61	
					Northern red oak-----	81	63	
					Southern red oak-----	79	61	
					Post oak-------------	72	54	
					Scarlet oak----------	81	63	
					Sweetgum-------------	76	70	
					Yellow-poplar--------	92	93	
Ch**: Chewacla----------	7W	Slight	Moderate	Slight	Yellow-poplar--------	95	98	Yellow-poplar, loblolly pine, sweetgum, American sycamore.
					Loblolly pine--------	95	142	
					Sweetgum-------------	97	128	
					Water oak------------	80	74	
					Eastern cottonwood---	---	---	
					Green ash------------	---	---	
					Southern red oak-----	---	---	
					Blackgum-------------	---	---	
					Red maple------------	---	---	
					Willow oak-----------	---	---	
					American beech-------	---	---	
					American sycamore----	---	---	
Congaree----------	10A	Slight	Slight	Slight	Sweetgum-------------	100	138	Loblolly pine, yellow-poplar, American sycamore, black walnut, cherrybark oak, eastern cottonwood sweetgum.
					Yellow-poplar--------	107	119	
					Cherrybark oak-------	---	---	
					Loblolly pine--------	90	131	
					Eastern cottonwood---	107	147	
					American sycamore----	89	96	
					Black walnut---------	---	---	
					Scarlet oak----------	100	82	
					Willow oak-----------	95	92	
					Green ash------------	---	---	
					American beech-------	---	---	
Co---------- Coxville	9W	Slight	Moderate	Moderate	Loblolly pine--------	91	133	Loblolly pine, sweetgum.
					Longleaf pine--------	77	94	
					Sweetgum-------------	84	90	
					Yellow-poplar--------	86	82	
					Southern red oak-----	87	69	
					Water oak------------	75	67	
					Willow oak-----------	88	70	
DoA, DoB---------- Dothan	9A	Slight	Slight	Slight	Loblolly pine--------	88	127	Loblolly pine, longleaf pine.
					Longleaf pine--------	84	110	
					Hickory--------------	---	---	
					Water oak------------	---	---	
DtB---------- Dothan	9A	Slight	Slight	Moderate	Loblolly pine--------	86	123	Loblolly pine, longleaf pine.
					Longleaf pine--------	70	79	
EnB, EnD---------- Enon	7A	Slight	Slight	Slight	Loblolly pine--------	73	98	Loblolly pine.
					Shortleaf pine-------	63	95	
					Virginia pine--------	---	---	
					Northern red oak-----	---	---	
					Sweetgum-------------	87	98	
					White oak------------	---	---	
					Yellow-poplar--------	88	86	
					Hickory--------------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
ExA---- Exum	8A	Slight	Slight	Slight	Loblolly pine	82	114	Loblolly pine.
					Longleaf pine	---	---	
					Sweetgum	---	---	
					Yellow-poplar	---	---	
					Southern red oak	---	---	
					White oak	---	---	
FaB---- Fuquay	8S	Slight	Moderate	Moderate	Loblolly pine	85	120	Loblolly pine,
					Longleaf pine	77	94	longleaf pine.
FuB---- Fuquay	8S	Slight	Moderate	Moderate	Loblolly pine	83	116	Loblolly pine,
					Longleaf pine	77	94	longleaf pine.
GaA, GaB, GaD---- Gilead	8A	Slight	Slight	Slight	Loblolly pine	84	118	Loblolly pine.
					Longleaf pine	70	79	
					Sweetgum	---	---	
					Blackgum	---	---	
					Post oak	---	---	
					Blackjack oak	---	---	
					Hickory	---	---	
GoA---- Goldsboro	9A	Slight	Slight	Slight	Loblolly pine	90	131	Loblolly pine.
					Longleaf pine	73	86	
					Sweetgum	---	---	
					Southern red oak	---	---	
					White oak	---	---	
					Water oak	---	---	
					Yellow-poplar	---	---	
Gr---- Grantham	9W	Slight	Moderate	Moderate	Loblolly pine	86	123	Loblolly pine,
					Sweetgum	---	---	sweetgum, yellow-
					Water oak	---	---	poplar.
					Blackgum	---	---	
					Red maple	---	---	
					Willow oak	---	---	
					Yellow-poplar	---	---	
					Pond pine	---	---	
HaB---- Helena	8A	Slight	Slight	Slight	Loblolly pine	84	118	Loblolly pine, yellow-
					Shortleaf pine	66	101	poplar.
					White oak	---	---	
					Yellow-poplar	---	---	
					Sweetgum	---	---	
					Northern red oak	---	---	
					Southern red oak	---	---	
					Black oak	---	---	
					Hickory	---	---	
					Virginia pine	---	---	
					Willow oak	---	---	
					American elm	---	---	
LaB---- Lakeland	4S	Slight	Moderate	Moderate	Longleaf pine	58	56	Loblolly pine,
					Loblolly pine	77	101	longleaf pine.
					Turkey oak	---	---	
					Blackjack oak	---	---	
					Post oak	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
LnB, LnD---------- Lillington	9A	Slight	Slight	Slight	Loblolly pine--------	80	110	Loblolly pine.
					Shortleaf pine-------	---	---	
					Longleaf pine--------	---	---	
					White oak-----------	---	---	
					Southern red oak-----	---	---	
					Sweetgum------------	---	---	
LnE---------- Lillington	9R	Moderate	Moderate	Moderate	Loblolly pine--------	80	110	Loblolly pine.
					Shortleaf pine-------	---	---	
					Longleaf pine--------	---	---	
					White oak-----------	---	---	
					Southern red oak-----	---	---	
					Sweetgum------------	---	---	
LoF---------- Louisa	7R	Moderate	Moderate	Moderate	Loblolly pine--------	72	96	Loblolly pine, eastern redcedar.
					Shortleaf pine-------	67	103	
					Southern red oak-----	70	52	
					Yellow-poplar--------	85	81	
					Longleaf pine--------	67	72	
Ly---------- Lynchburg	9W	Slight	Moderate	Slight	Loblolly pine--------	86	123	Loblolly pine, American sycamore, sweetgum.
					Longleaf pine--------	74	88	
					Yellow-poplar--------	92	93	
					Sweetgum------------	90	106	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
					Blackgum------------	---	---	
MaA, MaB---------- Marlboro	8A	Slight	Slight	Slight	Loblolly pine--------	82	114	Slash pine, loblolly pine.
					Longleaf pine--------	62	60	
Na---------- Nahunta	9W	Slight	Moderate	Slight	Loblolly pine--------	87	125	Loblolly pine.
					Sweetgum------------	---	---	
					Yellow-poplar--------	---	---	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
NeD---------- Nason	8A	Slight	Slight	Slight	Loblolly pine--------	80	110	Loblolly pine, eastern white pine.
					Northern red oak-----	66	48	
					Virginia pine--------	69	107	
					Shortleaf pine-------	66	101	
NeE---------- Nason	6R	Moderate	Moderate	Moderate	Loblolly pine--------	70	93	Loblolly pine.
					Virginia pine--------	59	88	
					Shortleaf pine-------	56	80	
					Northern red oak-----	56	39	
NoA, NoB, NoC------ Norfolk	8A	Slight	Slight	Slight	Loblolly pine--------	84	118	Loblolly pine.
					Longleaf pine--------	77	94	
					Southern red oak-----	---	---	
					White oak-----------	---	---	
					Yellow-poplar--------	---	---	
					Blackgum------------	---	---	
					Hickory-------------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
OrB Orangeburg	8A	Slight	Slight	Slight	Loblolly pine Longleaf pine	80 77	110 94	Loblolly pine.
PaE Pacolet	8A	Moderate	Moderate	Slight	Loblolly pine Shortleaf pine Yellow-poplar Virginia pine Northern red oak Hickory White oak	78 70 90 --- --- --- ---	107 110 90 --- --- --- ---	Loblolly pine, shortleaf pine, yellow-poplar, eastern white pine.
Pc Pactolus	9S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine Sweetgum Water oak Willow oak Red maple Black cherry	86 --- --- --- --- --- ---	123 --- --- --- --- --- ---	Loblolly pine.
Pf Pocalla	8S	Slight	Moderate	Moderate	Loblolly pine Longleaf pine	80 70	110 79	Loblolly pine, longleaf pine.
Pn Polawana	7W	Slight	Severe	Severe	Sweetgum Baldcypress Water tupelo Blackgum Water oak	90 --- --- --- ---	106 --- --- --- ---	Sweetgum, water tupelo.
Ps Portsmouth	11W	Slight	Severe	Severe	Loblolly pine Sweetgum Red maple Water oak Willow oak Sweetbay Redbay	101 --- --- --- --- --- ---	156 --- --- --- --- --- ---	Loblolly pine, sweetgum.
Ra Rains	10W	Slight	Moderate	Moderate	Loblolly pine Sweetgum	94 90	140 106	Loblolly pine, sweetgum, American sycamore.
Ro Roanoke	9W	Slight	Severe	Severe	Loblolly pine Willow oak Sweetgum	86 76 90	106 68 67	Loblolly pine, sweetgum, yellow-poplar.
StA State	9A	Slight	Slight	Slight	Loblolly pine Southern red oak Yellow-poplar Virginia pine Hickory American beech White oak	86 85 100 85 --- --- ---	123 67 107 --- --- --- ---	Loblolly pine, black walnut, yellow-poplar.
To Toisnot	7W	Slight	Severe	Severe	Loblolly pine Sweetgum	76 80	103 79	Loblolly pine, sweetgum.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Potential productivity: Common trees	Site index	Volume*	Trees to plant
VaB, VaD---------- Vaucluse	7A	Slight	Slight	Moderate	Loblolly pine--------	76	103	Loblolly pine.
					Shortleaf pine-------	56	80	
					Longleaf pine--------	---	---	
VeB, VeD---------- Vaucluse	7A	Slight	Slight	Moderate	Loblolly pine--------	76	103	Loblolly pine.
					Shortleaf pine-------	56	80	
VeE---------- Vaucluse	7A	Moderate	Moderate	Moderate	Loblolly pine--------	76	103	Loblolly pine.
					Shortleaf pine-------	56	80	
WaB, WaC---------- Wagram	8S	Slight	Moderate	Moderate	Loblolly pine--------	81	112	Loblolly pine,
					Longleaf pine--------	72	83	longleaf pine.
We---------- Wahee	9W	Slight	Moderate	Moderate	Loblolly pine--------	86	123	Loblolly pine,
					Sweetgum-----------	90	106	sweetgum,
					Blackgum-----------	---	---	American sycamore,
					Water oak----------	---	---	water oak.
					Swamp chestnut oak---	---	---	
					Willow oak----------	---	---	
					Southern red oak-----	---	---	
WfB---------- Wakulla	5S	Slight	Moderate	Moderate	Longleaf pine--------	69	77	Loblolly pine,
					Loblolly pine--------	73	98	longleaf pine.
					Shortleaf pine-------	69	108	
					Blackjack oak--------	---	---	
					Post oak-----------	---	---	
Wh---------- Wehadkee	8W	Slight	Severe	Moderate	Yellow-poplar--------	100	107	Yellow-poplar,
					Sweetgum-----------	94	119	loblolly pine, green
					Loblolly pine--------	93	138	ash, sweetgum.
					Willow oak----------	110	110	
					Water oak----------	91	87	
					Green ash----------	---	---	
					White ash----------	---	---	
					American sycamore----	---	---	
					River birch----------	---	---	
WkB, WkD---------- Wickham	9A	Slight	Slight	Slight	Loblolly pine--------	90	131	Loblolly pine.
					Yellow-poplar--------	89	88	
					White oak----------	84	66	
					Southern red oak-----	82	64	
					Sweetgum-----------	---	---	
					Red maple----------	---	---	
					Northern red oak-----	---	---	
					Water oak----------	---	---	
					Hickory------------	---	---	
					Shortleaf pine-------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AnB Alpin	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
AtA Altavista	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
Au Augusta	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
AyA Aycock	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight	Slight.
AyB Aycock	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight	Slight.
Bb Bibb	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding, too sandy.	Severe: wetness.	Severe: wetness, flooding.
BnB Blaney	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Severe: droughty.
BnD Blaney	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Severe: droughty.
CaB Candor	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
CaD Candor	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
CeB Cecil	Slight	Slight	Moderate: slope.	Slight	Slight.
CeD Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Ch*: Chewacla	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Congaree	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Co Coxville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
DoA Dothan	Slight	Slight	Slight	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
DoB---- Dothan	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
DtB---- Dothan	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight	Moderate: small stones, droughty.
DyF. Dystrochrepts					
EnB---- Enon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
EnD---- Enon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
ExA---- Exum	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
FaB---- Fuquay	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
FuB---- Fuquay	Moderate: small stones, too sandy.	Moderate: too sandy, small stones.	Severe: small stones.	Moderate: too sandy.	Moderate: small stones, droughty.
GaA---- Gilead	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness.	Moderate: wetness.	Moderate: wetness.
GaB---- Gilead	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
GaD---- Gilead	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
GoA---- Goldsboro	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
Gr---- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
HaB---- Helena	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
LaB---- Lakeland	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LnB Lillington	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
LnD Lillington	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
LnE Lillington	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, slope.
LoF Louisa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MaA Marlboro	Slight	Slight	Slight	Slight	Slight.
MaB Marlboro	Slight	Slight	Moderate: slope.	Slight	Slight.
Na Nahunta	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
NeD Nason	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
NeE Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
NoA Norfolk	Slight	Slight	Slight	Slight	Moderate: droughty.
NoB Norfolk	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
NoC Norfolk	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
NuB*: Norfolk	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Urban land.					
OrB Orangeburg	Slight	Slight	Moderate: slope.	Slight	Slight.
PaE Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Pc Pactolus	Severe: flooding.	Moderate: wetness, too sandy.	Moderate: too sandy, wetness.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
Pd*: Pits.					

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pd*: Dumps.					
Pf---- Pocalla	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Pn---- Polawana	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Ps---- Portsmouth	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ra---- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rb*: Rains----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.					
Ro---- Roanoke	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
StA---- State	Severe: flooding.	Slight----	Slight----	Slight----	Slight.
To---- Toisnot	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
VaB---- Vaucluse	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope.	Slight----	Moderate: droughty.
VaD---- Vaucluse	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----	Moderate: droughty, slope.
VeB---- Vaucluse	Severe: small stones.	Moderate: small stones, percs slowly.	Severe: small stones.	Slight----	Moderate: small stones, droughty.
VeD---- Vaucluse	Severe: small stones.	Moderate: slope, small stones.	Severe: slope.	Slight----	Moderate: small stones, droughty, slope.
VeE---- Vaucluse	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
WaB---- Wagram	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
WaC---- Wagram	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
We Wahee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
WfB Wakulla	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Wh Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
WkB Wickham	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
WkD Wickham	Severe: flooding.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AnB--Alpin	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
AtA--Altavista	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Au--Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AyA, AyB--Aycock	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Bb--Bibb	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
BnB--Blaney	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
BnD--Blaney	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
CaB, CaD--Candor	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
CeB--Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CeD--Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ch*:										
Chewacla	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Congaree	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Co--Coxville	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
DoA, DoB, DtB--Dothan	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DyF. Dystrochrepts										
EnB--Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnD--Enon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ExA--Exum	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
FaB, FuB--Fuquay	Fair	Fair	Good	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GaA, GaB---------- Gilead	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GaD---------- Gilead	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GoA---------- Goldsboro	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Gr---------- Grantham	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
HaB---------- Helena	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
LaB---------- Lakeland	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
LnB---------- Lillington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LnD---------- Lillington	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LnE---------- Lillington	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
LoF---------- Louisa	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Ly---------- Lynchburg	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
MaA, MaB---------- Marlboro	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Na---------- Nahunta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
NeD---------- Nason	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NeE---------- Nason	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NoA, NoB---------- Norfolk	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NoC---------- Norfolk	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NuB*: Norfolk----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
OrB---------- Orangeburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
PaE--- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Pc--- Pactolus	Fair	Fair	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pd*: Pits.										
Dumps.										
Pf--- Pocalla	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pn--- Polawana	Very poor.	Very poor.	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
Ps--- Portsmouth	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ra--- Rains	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Rb*: Rains---	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Urban land.										
Ro--- Roanoke	Poor	Poor	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
StA--- State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
To--- Toisnot	Good	Good	Good	Good	Good	Poor	Good	Good	Good	Fair.
VaB--- Vaucluse	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VaD--- Vaucluse	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VeB, VeD--- Vaucluse	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
VeE--- Vaucluse	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
WaB--- Wagram	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WaC--- Wagram	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
We--- Wahee	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
WfB--- Wakulla	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Wh---------- Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.
WkB---------- Wickham	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WkD---------- Wickham	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnB--- Alpin	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
AtA--- Altavista	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding, low strength.	Moderate: wetness.
Au--- Augusta	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Moderate: low strength, wetness, flooding.	Moderate: wetness.
AyA--- Aycock	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: low strength.	Slight.
AyB--- Aycock	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: low strength.	Slight.
Bb--- Bibb	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
BnB--- Blaney	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
BnD--- Blaney	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
CaB--- Candor	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
CaD--- Candor	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
CeB--- Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
CeD--- Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Moderate: slope.
Ch*: Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Congaree	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Co--- Coxville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
DoA---- Dothan	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
DoB---- Dothan	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Moderate: droughty.
DtB---- Dothan	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Moderate: small stones, droughty.
DyF. Dystrochrepts						
EnB---- Enon	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
EnD---- Enon	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
ExA---- Exum	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
FaB---- Fuquay	Slight	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
FuB---- Fuquay	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Moderate: small stones, droughty.
GaA---- Gilead	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
GaB---- Gilead	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: low strength, wetness.	Moderate: wetness.
GaD---- Gilead	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: wetness, slope.
GoA---- Goldsboro	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Gr---- Grantham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
HaB---- Helena	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
LaB---- Lakeland	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty, too sandy.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
LnB Lillington	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones.
LnD Lillington	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones.
LnE Lillington	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
LoF Louisa	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
MaA Marlboro	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
MaB Marlboro	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Na Nahunta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
NeD Nason	Moderate: slope, too clayey.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
NeE Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
NoA Norfolk	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
NoB Norfolk	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Moderate: droughty.
NoC Norfolk	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
NuB*: Norfolk	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Moderate: droughty.
Urban land.						
OrB Orangeburg	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
PaE Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pc Pactolus	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: wetness, droughty.
Pd*: Pits.						

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Pd*: Dumps.						
Pf---- Pocalla	Severe: cutbanks cave.	Slight----	Moderate: wetness.	Slight----	Slight----	Moderate: droughty.
Pn---- Polawana	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding, flooding.
Ps---- Portsmouth	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.
Ra---- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rb*: Rains----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
Ro---- Roanoke	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
StA---- State	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding.	Slight.
To---- Toisnot	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
VaB---- Vaucluse	Severe: cutbanks cave.	Slight----	Slight----	Moderate: slope.	Slight----	Moderate: droughty.
VaD---- Vaucluse	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
VeB---- Vaucluse	Moderate: dense layer.	Slight----	Slight----	Moderate: slope.	Slight----	Moderate: small stones, droughty.
VeD---- Vaucluse	Moderate: dense layer, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
VeE---- Vaucluse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
WaB---- Wagram	Severe: cutbanks cave.	Slight----	Slight----	Slight----	Slight----	Moderate: droughty.
WaC---- Wagram	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
We Wahee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
WfB Wakulla	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
Wh Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, low strength.	Severe: wetness, flooding.
WkB Wickham	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
WkD Wickham	Moderate: slope.	Severe: flooding.	Severe: flooding.	Severe: flooding,	Moderate: slope,	Moderate: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnB Alpin	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
AtA Altavista	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness, too clayey.
Au Augusta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
AyA Aycock	Severe: percs slowly.	Moderate: seepage, wetness.	Moderate: too clayey.	Slight	Fair: too clayey.
AyB Aycock	Severe: percs slowly.	Moderate: seepage, slope, wetness.	Moderate: too clayey.	Slight	Fair: too clayey.
Bb Bibb	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
BnB Blaney	Severe: percs slowly, poor filter.	Severe: seepage.	Slight	Severe: seepage.	Good.
BnD Blaney	Severe: percs slowly, poor filter.	Severe: seepage, slope.	Moderate: slope.	Severe: seepage.	Fair: slope.
CaB Candor	Slight	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
CaD Candor	Moderate: slope.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy.
CeB Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
CeD Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, hard to pack.
Ch*: Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ch*:					
Congaree	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: thin layer.
Co Coxville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
DoA Dothan	Severe: wetness, percs slowly.	Moderate: seepage.	Moderate: wetness.	Slight	Good.
DoB Dothan	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness.	Slight	Good.
DtB Dothan	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness, too clayey.	Severe: seepage.	Fair: too clayey, wetness.
DyF. Dystrochrepts					
EnB Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
EnD Enon	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
ExA Exum	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
FaB Fuquay	Severe: percs slowly, poor filter.	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Poor: seepage.
FuB Fuquay	Severe: percs slowly, poor filter.	Severe: seepage.	Moderate: too sandy.	Severe: seepage.	Poor: small stones.
GaA, GaB Gilead	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, hard to pack.
GaD Gilead	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, hard to pack, slope.
GoA Goldsboro	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Gr Grantham	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HaB Helena	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
LaB Lakeland	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
LnB Lillington	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: small stones.
LnD Lillington	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
LnE Lillington	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
LoF Louisa	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: seepage, depth to rock, slope.	Poor: slope, depth to rock, thin layer.
Ly Lynchburg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
MaA Marlboro	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
MaB Marlboro	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Na Nahunta	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
NeD Nason	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
NeE Nason	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
NoA, NoB Norfolk	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
NoC Norfolk	Moderate: wetness, percs slowly, slope.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope.
NuB*: Norfolk	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NuB*: Urban land.					
OrB---- Orangeburg	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
PaE---- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Pc---- Pactolus	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage.
Pd*: Pits.					
Dumps.					
Pf---- Pocalla	Moderate: wetness.	Severe: seepage.	Slight	Severe: seepage.	Good.
Pn---- Polawana	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
Ps---- Portsmouth	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Ra---- Rains	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Rb*: Rains----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Urban land.					
Ro---- Roanoke	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
StA---- State	Moderate: flooding, wetness, percs slowly.	Severe: seepage.	Severe: seepage, wetness.	Moderate: flooding, wetness.	Fair: too clayey, thin layer.
To---- Toisnot	Severe: cemented pan, ponding, percs slowly.	Severe: seepage, cemented pan, ponding.	Severe: ponding.	Severe: ponding, cemented pan.	Poor: cemented pan, ponding.
VaB---- Vaucluse	Severe: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
VaD---------- Vaucluse	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
VeB---------- Vaucluse	Severe: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
VeD---------- Vaucluse	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
VeE---------- Vaucluse	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
WaB---------- Wagram	Moderate: percs slowly.	Severe: seepage.	Slight----------	Severe: seepage.	Good.
WaC---------- Wagram	Moderate: percs slowly, slope.	Severe: seepage, slope.	Moderate: slope.	Severe: seepage.	Fair: slope.
We---------- Wahee	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
WfB---------- Wakulla	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
Wh---------- Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness, thin layer.
WkB---------- Wickham	Moderate: flooding, percs slowly.	Moderate: seepage, slope.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
WkD---------- Wickham	Moderate: flooding, percs slowly.	Severe: slope.	Moderate: flooding, slope,	Moderate: flooding, slope.	Fair: slope, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AnB Alpin	Good	Probable	Improbable: too sandy.	Poor: too sandy.
AtA Altavista	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Au Augusta	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
AyA, AyB Aycock	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Bb Bibb	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones.
BnB, BnD Blaney	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
CaB, CaD Candor	Good	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
CeB, CeD Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ch*: Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Congaree	Fair: low strength, wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Co Coxville	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
DoA, DoB Dothan	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
DtB Dothan	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones, thin layer.
DyF. Dystrochrepts				
EnB, EnD Enon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ExA Exum	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
FaB Fuquay	Good	Improbable: thin layer.	Improbable: too sandy.	Fair: too sandy, small stones.
FuB Fuquay	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
GaA, GaB, GaD Gilead	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
GoA Goldsboro	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Gr Grantham	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HaB Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LaB Lakeland	Good	Probable	Improbable: too sandy.	Poor: too sandy.
LnB, LnD Lillington	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
LnE Lillington	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
LoF Louisa	Poor: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
Ly Lynchburg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MaA, MaB Marlboro	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Na Nahunta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
NeD Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, area reclaim.
NeE Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope, area reclaim.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NoA, NoB, NoC--------- Norfolk	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
NuB*: Norfolk---------- Urban land.	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
OrB--------- Orangeburg	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
PaE--------- Pacolet	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Pc--------- Pactolus	Fair: wetness.	Probable----------	Improbable: too sandy.	Fair: too sandy.
Pd*: Pits. Dumps.				
Pf--------- Pocalla	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Pn--------- Polawana	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: wetness.
Ps--------- Portsmouth	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: wetness.
Ra--------- Rains	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Rb*: Rains---------- Urban land.	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Ro--------- Roanoke	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
StA--------- State	Good----------	Probable----------	Improbable: too sandy.	Fair: too clayey.
To--------- Toisnot	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
VaB, VaD---------- Vaucluse	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too sandy, small stones.
VeB, VeD---------- Vaucluse	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
VeE Vaucluse	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
WaB Wagram	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
WaC Wagram	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
We Wahee	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
WfB Wakulla	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Wh Wehadkee	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
WkB Wickham	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
WkD Wickham	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
AnB---- Alpin	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty.
AtA---- Altavista	Moderate: seepage.	Severe: piping, wetness.	Moderate: deep to water, slow refill.	Favorable----	Wetness----	Favorable.
Au---- Augusta	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable----	Wetness----	Wetness.
AyA---- Aycock	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Soil blowing, erodes easily.	Erodes easily.
AyB---- Aycock	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, soil blowing, erodes easily.	Erodes easily.
Bb---- Bibb	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding----	Wetness, flooding.	Erodes easily, wetness.
BnB---- Blaney	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Droughty, rooting depth.
BnD---- Blaney	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Slope, droughty, rooting depth.
CaB---- Candor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty.
CaD---- Candor	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, droughty.
CeB---- Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope----	Soil blowing.
CeD---- Cecil	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope----	Slope, soil blowing.
Ch*: Chewacla----	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Moderate: slow refill.	Flooding----	Wetness, soil blowing, flooding.	Wetness.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Ch*: Congaree	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding	Wetness, soil blowing.	Erodes easily.
Co Coxville	Slight	Severe: wetness.	Severe: slow refill.	Favorable	Wetness, soil blowing.	Wetness.
DoA Dothan	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Fast intake, droughty.	Droughty.
DoB Dothan	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Fast intake, slope, droughty.	Droughty.
DtB Dothan	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
DyF. Dystrochrepts						
EnB Enon	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly, soil blowing.	Percs slowly.
EnD Enon	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly, soil blowing.	Slope, percs slowly.
ExA Exum	Slight	Moderate: piping, wetness.	Severe: slow refill.	Favorable	Wetness, erodes easily, soil blowing.	Erodes easily.
FaB Fuquay	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty.
FuB Fuquay	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty.
GaA Gilead	Slight	Severe: piping.	Severe: no water.	Percs slowly	Wetness, fast intake, soil blowing.	Percs slowly.
GaB Gilead	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, fast intake.	Percs slowly.
GaD Gilead	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, fast intake.	Slope, percs slowly.
GoA Goldsboro	Moderate: seepage.	Moderate: piping, wetness.	Moderate: deep to water, slow refill.	Favorable	Wetness, droughty, fast intake.	Droughty, rooting depth.
Gr Grantham	Slight	Severe: wetness.	Severe: slow refill.	Favorable	Wetness, soil blowing, erodes easily.	Wetness, erodes easily.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
HaB---------- Helena	Slight---------	Severe: hard to pack.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Percs slowly.
LaB---------- Lakeland	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty.
LnB---------- Lillington	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, droughty.	Droughty.
LnD, LnE---------- Lillington	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, droughty.	Slope, droughty.
LoF---------- Louisa	Severe: slope, depth to rock, seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, depth to rock.	Slope.
Ly---------- Lynchburg	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness, soil blowing.	Wetness.
MaA---------- Marlboro	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing---	Favorable.
MaB---------- Marlboro	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Soil blowing, slope.	Favorable.
Na---------- Nahunta	Slight---------	Severe: wetness.	Severe: slow refill.	Favorable------	Wetness, erodes easily, soil blowing.	Wetness, erodes easily.
NeD, NeE---------- Nason	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Erodes easily, slope.	Slope, erodes easily.
NoA---------- Norfolk	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Fast intake, soil blowing.	Favorable.
NoB---------- Norfolk	Moderate: seepage, slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Slope, fast intake.	Favorable.
NoC---------- Norfolk	Severe: slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Slope, fast intake.	Slope.
NuB*: Norfolk----------	Moderate: seepage, slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Slope, fast intake.	Favorable.
Urban land.						
OrB---------- Orangeburg	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Fast intake, slope.	Favorable.
PaE---------- Pacolet	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Pc---------- Pactolus	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Droughty, rooting depth.
Pd*: Pits.						
Dumps.						
Pf---------- Pocalla	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
Pn---------- Polawana	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Flooding, cutbanks cave, ponding.	Ponding, droughty, fast intake.	Wetness, droughty.
Ps---------- Portsmouth	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, soil blowing.	Wetness.
Ra---------- Rains	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
Rb*: Rains----------	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Favorable------	Wetness--------	Wetness.
Urban land.						
Ro---------- Roanoke	Severe: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Wetness, erodes easily, percs slowly.
StA---------- State	Severe: seepage.	Moderate: thin layer, piping.	Severe: cutbanks cave.	Deep to water	Soil blowing---	Favorable.
To---------- Toisnot	Moderate: cemented pan.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Cemented pan, percs slowly, ponding.	Ponding, droughty.	Wetness, erodes easily, droughty.
VaB---------- Vaucluse	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty, rooting depth.
VaD---------- Vaucluse	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, droughty, rooting depth.
VeB---------- Vaucluse	Severe: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty, rooting depth.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
VeD, VeE Vaucluse	Severe: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, droughty, rooting depth.
WaB Wagram	Severe: seepage.	Slight	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty, rooting depth.
WaC Wagram	Severe: seepage, slope.	Slight	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, droughty, rooting depth.
We Wahee	Slight	Severe: wetness, hard to pack.	Severe: slow refill.	Percs slowly, flooding.	Wetness, soil blowing.	Wetness, percs slowly.
WfB Wakulla	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Droughty.
Wh Wehadkee	Moderate: seepage.	Severe: wetness, piping.	Moderate: slow refill.	Flooding	Wetness, soil blowing, flooding.	Wetness.
WkB Wickham	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Favorable.
WkD Wickham	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
AnB--- Alpin	0-5	Sand---	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	5-38	Fine sand, loamy sand, sand.	SP-SM, SM	A-3, A-2-4	0	95-100	90-100	60-100	5-20	---	NP
	38-86	Fine sand, sand	SP-SM, SM	A-2-4	0	95-100	90-100	60-100	11-20	---	NP
AtA--- Altavista	0-8	Fine sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	8-35	Clay loam, sandy clay loam, loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	95-100	95-100	60-99	45-75	20-45	5-28
	35-60	Variable---	---	---	---	---	---	---	---	---	---
Au--- Augusta	0-12	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0	90-100	75-100	50-98	30-60	<25	NP-7
	12-50	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-100	51-80	20-45	5-25
	50-60	Variable---	---	---	---	---	---	---	---	---	---
AyA, AyB--- Aycock	0-10	Silt loam---	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-80	<25	NP-10
	10-64	Clay loam, silty clay loam, loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-90	22-49	8-30
Bb--- Bibb	0-60	Loam, sandy loam, loamy sand.	ML, CL-ML	A-4	0-5	95-100	90-100	80-90	50-80	<25	NP-7
BnB, BnD--- Blaney	0-22	Loamy sand---	SM, SP-SM	A-2, A-3	0	95-100	95-100	60-85	8-30	---	NP
	22-46	Sandy clay loam, sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6, A-1-b	0	95-100	90-100	25-85	20-49	<40	NP-20
	46-64	Sandy loam, sandy clay loam, loamy sand.	SM, SC, SC-SM	A-2, A-4, A-6, A-1-b	0	95-100	90-100	24-85	15-49	<36	NP-14
CaB, CaD--- Candor	0-25	Sand---	SM, SP-SM	A-2, A-3, A-2-4	0-2	98-100	96-100	55-90	5-15	---	NP
	25-35	Loamy sand---	SM, SP-SM	A-2, A-2-4	0-2	98-100	96-100	63-90	10-25	---	NP
	35-85	Sand---	SM, SP-SM	A-2, A-3	0-7	90-100	90-100	55-90	5-15	---	NP
CeB, CeD--- Cecil	0-4	Fine sandy loam	SM, SC-SM	A-2, A-4	0-5	84-100	80-100	67-90	26-42	<30	NP-7
	4-15	Sandy clay loam, clay loam.	SM, SC, ML, CL	A-4, A-6	0-5	75-100	75-100	68-95	38-81	21-35	3-15
	15-27	Clay, clay loam	MH, ML	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	27-68	Variable---	---	---	---	---	---	---	---	---	---
Ch*: Chewacla---	0-24	Loam---	SM, SC-SM	A-2, A-4	0	98-100	95-100	60-90	30-50	<30	NP-7
	24-38	Silt loam, silty clay loam, clay loam.	ML, CL	A-4, A-6, A-7	0	96-100	95-100	80-100	51-98	30-49	4-22
	38-62	Clay loam, loam, sandy loam.	SM, SC-SM, ML, CL	A-4, A-7-6, A-6	0	96-100	95-100	60-100	36-70	20-45	2-15

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Ch*:											
Congaree	0-18	Sandy loam	SM, SC-SM	A-2, A-4	0	95-100	95-100	70-100	20-49	<30	NP-7
	18-70	Silty clay loam, fine sandy loam, loam, silt loam.	SC, ML, CL, SM, CL-ML	A-4, A-6, A-7	0	95-100	95-100	70-100	40-90	25-50	3-22
Co	0-6	Loam	SM, ML, CL-ML, CL	A-4, A-6, A-7	0	100	100	85-97	46-75	20-46	3-15
Coxville	6-60	Clay loam, sandy clay, clay.	CL, CH	A-6, A-7	0	100	100	85-98	50-85	30-55	12-35
DoA, DoB	0-12	Loamy sand	SM	A-2	0	95-100	92-100	60-80	13-30	---	NP
Dothan	12-80	Sandy clay loam, sandy loam, fine sandy loam.	SC-SM, SC, SM	A-2, A-4, A-6	0	95-100	92-100	60-90	23-49	<40	NP-16
DtB	0-12	Gravelly loamy sand.	SM	A-2	5-15	75-95	60-85	50-70	13-30	---	NP
Dothan	12-80	Sandy clay loam, sandy loam.	SC-SM, SC, SM	A-2, A-4, A-6	0	95-100	92-100	68-90	23-45	<40	NP-16
DyF.											
Dystrochrepts											
EnB, EnD	0-5	Fine sandy loam	SM, SC-SM, SC	A-2-4, A-4	0-5	80-100	80-100	60-85	25-49	<30	NP-10
Enon	5-24	Clay loam, clay	CH, CL	A-7-6	0-5	85-100	80-100	75-98	65-95	40-90	25-65
	24-60	Variable	---	---	---	---	---	---	---	---	---
ExA	0-8	Very fine sandy loam.	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-80	<25	NP-10
Exum	8-80	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-90	22-49	8-30
FaB	0-28	Loamy sand	SP-SM, SM	A-2, A-3	0	95-100	90-100	50-83	5-35	---	NP
Fuquay	28-36	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	85-100	85-100	70-90	23-45	<45	NP-13
	36-72	Sandy clay loam	SC, SC-SM, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	58-90	28-49	25-45	4-13
FuB	0-28	Gravelly loamy sand.	SM	A-2	5-15	75-95	60-85	50-70	13-30	---	NP
Fuquay	28-36	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC, SC-SM	A-2, A-4, A-6, A-5	0	85-100	85-100	70-90	23-45	<45	NP-13
	36-72	Sandy clay loam	SC, SC-SM, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	58-90	28-49	25-45	4-13
GaA, GaB, GaD	0-5	Loamy sand	SP-SM, SM	A-2	0-5	90-100	75-100	55-85	10-35	---	NP
Gilead	5-8	Sandy loam, sandy clay loam.	SC-SM, SC	A-2, A-4, A-6	0-5	95-100	70-100	65-95	30-49	<30	4-10
	8-42	Sandy clay, clay loam, clay.	SC, CL, CH, ML	A-6, A-7, A-5, A-4	0-5	95-100	85-100	75-98	45-80	35-70	9-25
	42-72	Sandy loam, sandy clay loam.	SC, CL, CL-ML, SC-SM	A-2, A-6, A-4	0-5	95-100	85-100	70-98	30-60	<32	4-16
	72-80	Variable	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
GoA---------- Goldsboro	0-12	Loamy sand-------	SM	A-2	0	95-100	95-100	50-95	13-30	<20	NP
	12-75	Sandy clay loam, clay loam, sandy clay.	SC, CL, CL-ML, CH	A-4, A-6, A-7-6	0	95-100	90-100	65-95	36-70	25-55	6-32
Gr---------- Grantham	0-5	Loam----------	ML, CL-ML	A-4	0	100	100	85-100	55-85	<30	NP-7
	5-80	Loam, clay loam, silty clay.	CL	A-4, A-6, A-7	0	100	100	90-100	60-95	22-49	8-30
HaB---------- Helena	0-8	Fine sandy loam	SM, SC-SM, SC, ML	A-2, A-4	0-5	90-100	90-100	51-95	26-75	<35	NP-10
	8-15	Sandy clay loam, clay loam.	CL, SC	A-6, A-7	0-5	95-100	95-100	70-90	38-70	30-49	15-26
	15-48	Clay loam, sandy clay loam, clay.	CH	A-7	0-5	95-100	95-100	73-97	56-86	50-85	24-50
	48-60	Variable---------	---	---	---	---	---	---	---	---	---
LaB---------- Lakeland	0-60	Sand----------	SP-SM	A-3, A-2-4	0	90-100	90-100	60-100	5-12	---	NP
	60-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	90-100	90-100	50-100	1-12	---	NP
LnB, LnD, LnE---- Lillington	0-16	Gravelly sandy loam.	GM, GP-GM, SM, SP-SM	A-1, A-2	0-10	55-90	25-65	20-55	10-30	---	NP
	16-44	Very gravelly sandy clay loam, very gravelly clay loam.	GM, GC, SM, SC	A-1, A-2, A-4, A-6	0-10	55-90	25-65	20-55	20-49	20-40	3-15
	44-80	Stratified gravelly loamy sand to extremely gravelly sandy clay loam.	GM, SM	A-1, A-2	0-10	30-80	25-65	20-55	15-30	---	NP
LoF---------- Louisa	0-7	Fine sandy loam	SM, ML	A-2, A-4	0	85-100	75-95	50-80	20-70	---	NP
	7-15	Gravelly loam, gravelly sandy loam.	SM	A-2, A-4	0-5	80-95	60-80	50-70	20-45	---	NP
	15-32	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ly---------- Lynchburg	0-6	Sandy loam-------	SM, ML, SC-SM, CL-ML	A-2, A-4	0	92-100	90-100	75-100	25-55	<20	NP-7
	6-72	Sandy clay loam, sandy loam, clay loam.	SC-SM, SC, CL, CL-ML	A-2, A-4, A-6	0	92-100	90-100	70-100	25-67	15-40	4-18
MaA, MaB---------- Marlboro	0-10	Sandy loam-------	SM, SC-SM, ML, CL-ML	A-2, A-4	0	98-100	95-100	75-100	30-60	<35	NP-7
	10-72	Sandy clay, clay loam, sandy clay loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	98-100	95-100	78-100	51-70	25-48	6-20
	72-80	Sandy clay loam, sandy clay, clay.	CL, ML, SM, SC	A-4, A-6, A-7	0	98-100	95-100	74-100	45-70	24-48	6-20
Na---------- Nahunta	0-7	Loam----------	ML, CL-ML, CL	A-4	0	100	95-100	80-100	51-85	<25	NP-10
	7-80	Loam, clay loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	95-100	90-100	60-95	22-49	8-30

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
NeD, NeE--------- Nason	0-6	Silt loam---------	ML, CL-ML, CL	A-4, A-6	0-5	80-100	75-100	55-95	50-85	15-35	NP-15
	6-34	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	34-44	Channery silt loam, silt loam, loam.	CL-ML, SC, GM-GC, SM-SC	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
	44-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
NoA, NoB, NoC---- Norfolk	0-11	Loamy sand-------	SM	A-2	0	95-100	92-100	50-95	13-30	<20	NP
	11-16	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	16-80	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
NuB*: Norfolk---------	0-11	Loamy sand-------	SM	A-2	0	95-100	92-100	50-95	13-30	<20	<4
	11-16	Sandy loam, sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	95-100	91-100	70-96	30-63	20-38	4-15
	16-80	Sandy clay loam, clay loam, sandy clay.	SC, SC-SM, CL, CL-ML	A-4, A-6, A-7-6	0	100	98-100	65-98	36-72	20-52	4-23
Urban land.											
OrB--------------- Orangeburg	0-19	Loamy sand-------	SM	A-2	0	98-100	95-100	60-87	14-28	---	<4
	19-24	Sandy loam-------	SM	A-2	0	98-100	95-100	70-96	25-35	<30	NP-4
	24-80	Sandy clay loam, sandy loam.	SC, CL, SM, SC-SM	A-6, A-4	0	98-100	95-100	71-96	38-58	22-40	3-19
PaE--------------- Pacolet	0-6	Fine sandy loam	SM, SC-SM	A-2, A-1-b, A-4	0-2	85-100	80-100	42-90	16-42	<28	NP-7
	6-29	Sandy clay, clay loam, clay.	ML, MH	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	29-60	Sandy loam, fine sandy loam, loam.	SM, SC-SM	A-4, A-2-4	0-2	80-100	70-100	60-90	25-50	<28	NP-6
Pc---------------- Pactolus	0-24	Loamy sand-------	SM, SP-SM	A-2, A-3	0	100	100	51-100	6-30	---	NP
	24-70	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	0	100	100	51-100	5-30	---	NP
Pd*: Pits.											
Dumps.											
Pf---------------- Pocalla	0-21	Loamy sand-------	SP-SM, SM	A-2	0	100	100	50-70	11-27	---	NP
	21-34	Sandy loam-------	SM	A-2	0	100	100	50-75	15-30	<25	NP-4
	34-54	Sand, loamy sand	SP-SM, SM	A-2, A-3	0	100	100	50-75	5-20	---	NP
	54-85	Sandy clay loam, sandy loam.	SC-SM, SC, SM	A-2, A-4, A-6	0	100	100	60-80	28-50	<35	3-15

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
Pn	0-27	Loamy sand	SM, SP-SM	A-2	0	100	98-100	70-90	10-35	---	NP
Polawana	27-62	Loamy fine sand, loamy sand, fine sand.	SM, SP-SM	A-2, A-3	0	100	98-100	75-98	5-20	---	NP
Ps	0-22	Loam	SM, SC-SM, ML, CL-ML	A-2, A-4	0	98-100	98-100	65-95	30-65	<30	NP-7
Portsmouth	22-38	Loam, sandy clay loam, clay loam.	SC, CL-ML, CL, SM-SC	A-4, A-6	0	98-100	98-100	75-95	36-70	18-40	NP-18
	38-72	Loamy sand, sandy loam.	SM, SM-SC	A-2	0	98-100	98-100	50-70	13-35	<18	NP-4
Ra	0-10	Sandy loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0	100	95-100	50-85	25-56	<35	NP-10
Rains	10-64	Sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	55-98	30-70	18-40	4-20
	64-72	Sandy loam, sandy clay loam, sandy clay.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-60	<40	3-18
Rb*:											
Rains	0-10	Sandy loam	SM, ML SM-SC, CL-ML	A-2, A-4	0	100	95-100	50-85	25-56	<35	NP-10
	10-64	Sandy clay loam, clay loam.	SC, SC-SM, CL, CL-ML	A-2, A-4, A-6	0	100	95-100	55-98	30-70	18-40	4-20
	64-72	Sandy loam, sandy clay loam, sandy clay.	SM, SC, ML, CL	A-2, A-4, A-6	0	100	95-100	60-95	30-60	15-40	3-18
Urban land.											
Ro	0-12	Loam	SC-SM, CL-ML, CL, SC	A-4, A-6	0	95-100	85-100	60-100	35-90	20-35	5-16
Roanoke	12-46	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	85-100	80-100	80-95	35-45	14-20
	46-60	Stratified loamy sand to clay.	CL-ML, GM-GC, CH, SM	A-1, A-2, A-4	0-5	40-100	35-100	25-95	15-90	<60	NP-40
StA	0-10	Sandy loam	SM, ML, CL-ML, SC-SM	A-2, A-4	0	95-100	95-100	45-85	25-55	<28	NP-7
State	10-30	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-22
	30-60	Stratified sand to fine sandy loam.	SM, SC-SM, SP-SM	A-1, A-2, A-3, A-4	0	85-100	60-100	40-90	5-50	<25	NP-7
To	0-8	Loam	CL-ML, CL	A-4, A-6	0	100	100	85-95	60-75	20-30	5-15
Toisnot	8-30	Sandy loam, fine sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	100	100	60-85	30-49	<25	NP-10
	30-60	Loamy sand, sandy loam.	SM, SC-SM	A-2, A-4	0	100	100	50-75	20-49	<25	NP-7

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
VaB, VaD----------	0-6	Loamy sand-------	SM, SP-SM	A-2, A-3	0-5	90-100	90-100	51-75	8-30	---	NP
Vaucluse	6-44	Sandy clay loam, sandy loam.	SC, SC-SM	A-2, A-4, A-6	0-5	90-100	90-100	51-75	25-50	20-40	5-18
	44-60	Loamy sand, sand	SM, SP-SM	A-2, A-3	0	90-100	90-100	51-75	8-30	---	NP
VeB, VeD, VeE----	0-14	Gravelly loamy sand.	SM, SP-SM	A-1, A-2	2-5	70-90	55-80	30-50	8-30	---	NP
Vaucluse	14-41	Sandy clay loam, sandy loam.	SC, SC-SM	A-2, A-4, A-6	0-5	90-100	90-100	51-75	25-49	20-40	5-15
	41-64	Sandy loam, sandy clay loam, sandy clay.	SM, SC, SC-SM	A-2, A-4, A-6	0-5	95-100	95-100	51-90	15-49	<30	NP-12
WaB, WaC----------	0-29	Loamy sand-------	SM, SP-SM	A-2, A-3	0	100	98-100	50-85	8-35	---	NP
Wagram	29-80	Sandy clay loam, sandy loam.	SC	A-2, A-4, A-6, A-7	0	100	98-100	60-95	31-49	21-41	8-25
We----------	0-10	Fine sandy loam	SM, SC-SM	A-2, A-4	0	100	95-100	50-98	30-49	<28	NP-7
Wahee	10-39	Clay, clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	85-100	51-92	38-81	16-54
	39-62	Variable---------	---	---	---	---	---	---	---	---	---
WfB----------	0-11	Sand----------	SP, SP-SM	A-3	0	100	100	55-90	4-10	---	NP
Wakulla	11-36	Loamy sand, loamy fine sand, loamy coarse sand.	SM, SP-SM	A-2	0	100	100	55-85	10-25	---	NP
	36-96	Sand, fine sand, coarse sand.	SM, SP-SM, SP	A-2, A-3	0	100	100	50-70	4-15	---	NP
Wh----------	0-6	Loam----------	SM, SC, SC-SM	A-2, A-4	0	100	95-100	60-90	30-49	<30	NP-10
Wehadkee	6-40	Silt loam, silty clay loam, very fine sandy loam.	CL-ML, ML, SC	A-6, A-7, A-4	0	100	99-100	85-100	45-98	20-58	6-25
	40-80	Variable---------	---	---	---	---	---	---	---	---	---
WkB, WkD----------	0-4	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-4	0	95-100	90-100	70-100	45-80	<25	NP-7
Wickham	4-19	Sandy clay loam, clay loam, loam.	CL-ML, CL, SC, SM	A-2, A-4, A-6, A-7-6	0	95-100	90-100	75-100	30-70	20-41	3-15
	19-72	Variable---------	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AnB	0-5	1-10	1.35-1.55	2.0-6.0	0.05-0.10	4.5-6.5	Low	0.10	5	1	0-2
Alpin	5-74	1-7	1.40-1.55	6.0-20	0.03-0.09	4.5-6.5	Low	0.10			
	74-86	5-8	1.45-1.65	2.0-6.0	0.06-0.09	4.5-6.5	Low	0.10			
AtA	0-8	10-20	1.30-1.50	2.0-6.0	0.12-0.20	3.6-6.0	Low	0.24	5	3	.5-3
Altavista	8-35	18-35	1.30-1.50	0.6-2.0	0.12-0.20	3.6-6.0	Low	0.24			
	35-60	---	---	---	---	---	---	----			
Au	0-12	5-20	1.40-1.70	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.20	4	---	.5-2
Augusta	12-50	20-35	1.35-1.60	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.24			
	50-60	---	---	0.6-20	---	---	---	----			
AyA, AyB	0-10	4-15	1.30-1.60	2.0-6.0	0.15-0.20	4.5-5.5	Low	0.37	5	3	1-4
Aycock	10-64	18-35	1.30-1.60	0.2-2.0	0.15-0.20	4.5-5.5	Low	0.43			
Bb	0-60	2-18	1.20-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28	5	5	.5-2
Bibb											
BnB, BnD	0-22	2-10	1.35-1.75	>6.0	0.03-0.06	4.5-5.5	Low	0.15	4	2	<1
Blaney	22-46	18-35	1.75-1.95	0.2-0.6	0.05-0.10	4.5-5.5	Low	0.28			
	46-64	10-25	1.70-1.90	0.2-0.6	0.03-0.08	4.5-5.5	Low	0.28			
CaB, CaD	0-25	1-4	1.60-1.70	6.0-20	0.02-0.06	3.6-5.5	Low	0.10	5	1	.5-1
Candor	25-35	6-12	1.55-1.70	6.0-20	0.06-0.10	3.6-5.5	Low	0.10			
	35-60	1-4	1.60-1.70	6.0-20	0.02-0.05	3.6-5.5	Low	0.10			
	60-85	10-35	1.35-1.60	0.6-2.0	0.12-0.16	3.5-5.5	Low	0.20			
CeB, CeD	0-4	5-20	1.30-1.50	2.0-6.0	0.12-0.14	4.5-5.5	Low	0.28	4	3	.5-2
Cecil	4-15	20-35	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28			
	15-27	35-70	1.30-1.50	0.6-2.0	0.13-0.15	4.5-5.5	Low	0.28			
	27-68	---	---	---	---	---	---	----			
Ch*:											
Chewacla	0-24	5-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.5	Low	0.24	5	3	1-4
	24-38	18-35	1.30-1.50	0.6-2.0	0.15-0.24	4.5-6.5	Low	0.32			
	38-62	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.5	Low	0.28			
Congaree	0-18	5-15	1.30-1.60	0.6-6.0	0.12-0.18	4.5-7.3	Low	0.24	5	3	<4
	18-70	18-35	1.20-1.50	0.6-2.0	0.12-0.20	4.5-7.3	Low	0.37			
Co	0-6	5-27	1.45-1.65	0.6-2.0	0.12-0.17	3.6-5.5	Low	0.24	5	3	2-4
Coxville	6-60	35-60	1.25-1.45	0.2-0.6	0.14-0.18	3.6-5.5	Moderate	0.32			
DoA, DoB	0-12	5-15	1.30-1.60	2.0-6.0	0.06-0.10	4.5-6.0	Very low	0.15	5	2	<.5
Dothan	12-80	18-35	1.40-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.28			
DtB	0-12	5-15	1.20-1.50	2.0-6.0	0.04-0.08	4.5-6.0	Low	0.10	5	---	<.5
Dothan	12-80	18-35	1.30-1.50	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.28			
DyF.											
Dystrochrepts											
EnB, EnD	0-5	10-20	1.45-1.65	2.0-6.0	0.11-0.15	5.1-6.5	Low	0.28	3	3	.5-2
Enon	5-24	35-60	1.20-1.40	0.06-0.2	0.12-0.16	5.1-7.8	High	0.28			
	24-60	---	---	---	---	---	---	----			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
ExA	0-8	6-15	1.30-1.50	2.0-6.0	0.15-0.20	3.6-5.5	Low	0.37	5	3	.5-2
Exum	8-80	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.37			
FaB, FuB	0-28	2-10	1.60-1.70	>6.0	0.04-0.09	4.5-6.0	Low	0.15	5	2	.5-2
Fuquay	28-36	10-35	1.40-1.60	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.20			
	36-72	20-35	1.40-1.60	0.06-0.2	0.10-0.13	4.5-6.0	Low	0.20			
GaA, GaB, GaD	0-5	4-10	1.50-1.70	2.0-6.0	0.05-0.09	4.5-5.5	Low	0.17	3	2	.5-1
Gilead	5-8	10-35	1.40-1.60	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24			
	8-42	35-60	1.40-1.60	0.06-0.6	0.12-0.16	4.5-5.5	Low	0.28			
	42-72	10-35	1.50-1.70	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.24			
	72-80	---	---	---	---	4.5-5.5	---	---			
GoA	0-12	2-8	1.55-1.75	6.0-20	0.06-0.11	3.6-5.5	Low	0.17	5	2	.5-2
Goldsboro	12-75	20-34	1.30-1.40	0.6-2.0	0.11-0.20	3.6-5.5	Low	0.24			
Gr	0-5	6-18	1.30-1.50	2.0-6.0	0.13-0.20	3.6-5.5	Low	0.37	5	3	2-4
Grantham	5-80	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43			
HaB	0-8	5-20	1.58-1.62	2.0-6.0	0.10-0.12	3.6-5.5	Low	0.24	4	3	.5-2
Helena	8-15	20-35	1.46-1.56	0.2-0.6	0.13-0.15	3.6-5.5	Moderate	0.28			
	15-48	35-60	1.44-1.55	0.06-0.2	0.13-0.15	3.6-5.5	High	0.28			
	48-60	---	---	---	---	---	---	---			
LaB	0-60	2-8	1.35-1.65	6.0-20	0.05-0.09	4.5-6.0	Low	0.10	5	1	.5-1
Lakeland	60-80	1-6	1.50-1.60	6.0-20	0.02-0.08	4.5-6.0	Low	0.10			
LnB, LnD, LnE	0-16	8-15	1.60-1.70	6.0-20	0.05-0.10	4.5-6.0	Low	0.15	5	8	.5-2
Lillington	16-44	10-35	1.50-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.10			
	44-80	5-25	1.50-1.70	0.6-6.0	0.05-0.13	4.5-5.5	Low	0.10			
LoF	0-7	10-20	1.25-1.55	2.0-6.0	0.12-0.16	4.5-6.0	Low	0.28	2	---	.5-2
Louisa	7-15	12-27	1.35-1.55	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.24			
	15-32	---	---	0.00-0.06	---	---	---	---			
Ly	0-6	5-20	1.30-1.60	2.0-6.0	0.09-0.13	3.6-5.5	Low	0.20	5	3	.5-5
Lynchburg	6-72	18-35	1.30-1.50	0.6-2.0	0.12-0.16	3.6-5.5	Low	0.20			
MaA, MaB	0-10	5-20	1.30-1.60	2.0-6.0	0.09-0.14	5.1-6.5	Low	0.20	5	3	.5-2
Marlboro	10-72	35-65	1.20-1.50	0.6-2.0	0.14-0.18	4.5-6.0	Low	0.20			
	72-80	30-60	1.20-1.50	0.6-2.0	0.12-0.18	4.5-6.0	Low	0.20			
Na	0-7	10-27	1.30-1.50	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.43	5	3	2-4
Nahunta	7-80	18-35	1.30-1.40	0.2-0.6	0.15-0.20	3.6-5.5	Low	0.43			
NeD, NeE	0-6	10-27	1.25-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.43	4	---	1-3
Nason	6-34	35-50	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate	0.28			
	34-44	10-25	1.25-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.28			
	44-60	---	---	0.0-0.06	---	---	---	---			
NoA, NoB, NoC	0-11	2-8	1.55-1.70	6.0-20	0.06-0.11	3.6-5.5	Low	0.17	5	2	.5-2
Norfolk	11-16	18-35	1.30-1.65	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.24			
	16-80	20-43	1.20-1.65	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.24			
NuB*:											
Norfolk	0-11	2-8	1.55-1.70	6.0-20	0.06-0.11	3.6-6.0	Low	0.17	5	2	.5-2
	11-16	18-35	1.30-1.65	0.6-2.0	0.10-0.18	3.6-5.5	Low	0.24			
	16-80	20-43	1.20-1.65	0.6-2.0	0.12-0.18	3.6-5.5	Low	0.24			
Urban land.											

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
OrB	0-19	4-15	1.35-1.55	2.0-6.0	0.06-0.09	4.5-6.0	Low	0.10	5	---	.5-1
Orangeburg	19-24	7-18	1.50-1.65	2.0-6.0	0.09-0.12	4.5-6.0	Low	0.20			
	24-80	18-35	1.60-1.75	0.6-2.0	0.11-0.14	4.5-5.5	Low	0.24			
PaE	0-6	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.0	Low	0.20	3	3	.5-2
Pacolet	6-29	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-6.0	Low	0.28			
	29-60	10-25	1.20-1.50	0.6-2.0	0.08-0.15	4.5-6.0	Low	0.28			
Pc	0-24	2-12	1.60-1.75	6.0-20	0.05-0.10	3.6-5.5	Low	0.10	5	2	.5-2
Pactolus	24-70	2-12	1.60-1.75	6.0-20	0.03-0.07	3.6-5.5	Low	0.10			
Pd*:											
Pits.											
Dumps.											
Pf	0-21	2-12	1.60-1.70	>6.0	0.08-0.11	4.5-5.5	Low	0.10	5	2	<1
Pocalla	21-34	10-25	1.55-1.70	2.0-6.0	0.10-0.13	4.5-5.5	Low	0.10			
	34-54	2-10	1.65-1.80	6.0-20	0.06-0.10	4.5-5.5	Low	0.10			
	54-85	10-35	1.50-1.75	0.6-2.0	0.10-0.13	4.5-5.5	Low	0.15			
Pn	0-27	2-12	1.30-1.55	6.0-20	0.07-0.12	4.5-7.3	Low	0.10	5	8	3-10
Polawana	27-62	2-12	1.50-1.60	6.0-20	0.04-0.10	4.5-7.3	Low	0.10			
Ps	0-22	5-25	1.30-1.40	0.6-6.0	0.12-0.18	3.6-5.5	Low	0.24	5	3	3-8
Portsmouth	22-38	20-35	1.45-1.55	0.6-2.0	0.14-0.20	3.6-5.5	Low	0.28			
	38-72	8-18	1.40-1.60	2.0-6.0	0.06-0.10	3.6-5.5	Low	0.17			
Ra	0-10	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-6.5	Low	0.20	5	3	1-6
Rains	10-64	18-35	1.30-1.60	0.6-2.0	0.11-0.15	3.6-5.5	Low	0.24			
	64-72	15-45	1.30-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28			
Rb*:											
Rains	0-10	5-20	1.30-1.60	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.20	5	3	1-6
	10-64	18-35	1.30-1.60	0.6-2.0	0.11-0.15	3.6-5.5	Low	0.24			
	64-72	15-45	1.30-1.60	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.28			
Urban land.											
Ro	0-12	10-27	1.20-1.50	0.6-2.0	0.14-0.20	3.6-5.5	Low	0.37	4	5	.5-2
Roanoke	12-46	20-35	1.20-1.50	<0.2	0.16-0.19	3.6-5.5	Moderate	0.24			
	46-60	5-50	1.20-1.50	0.06-0.2	0.04-0.14	3.6-5.5	Moderate	0.24			
StA	0-10	10-20	1.25-1.40	0.6-6.0	0.08-0.15	3.6-5.5	Low	0.28	5	3	<2
State	10-30	18-34	1.35-1.50	0.6-2.0	0.14-0.19	3.6-5.5	Low	0.28			
	30-60	2-15	1.35-1.50	>2.0	0.02-0.10	3.6-5.5	Low	0.17			
To	0-8	15-27	1.30-1.50	2.0-6.0	0.15-0.20	4.5-5.5	Low	0.15	3	---	.5-2
Toisnot	8-30	5-15	1.45-1.65	0.2-0.6	0.10-0.15	4.5-5.5	Low	0.32			
	30-60	7-17	1.45-1.65	0.06-0.2	<0.06	4.5-5.5	Low	0.43			
VaB, VaD	0-6	2-10	1.30-1.60	6.0-20	0.04-0.08	3.6-5.5	Low	0.15	3	2	<1
Vaucluse	6-44	18-35	1.35-1.75	0.06-0.6	0.10-0.15	3.6-5.5	Low	0.24			
	44-60	2-15	1.30-1.60	0.06-0.6	0.04-0.08	3.6-5.5	Low	0.15			
VeB, VeD, VeE	0-14	0-10	1.30-1.60	6.0-20	0.04-0.07	3.6-5.5	Low	0.10	3	2	<2
Vaucluse	14-41	18-35	1.35-1.75	0.06-0.6	0.10-0.15	3.6-5.5	Low	0.24			
	41-64	5-30	1.55-1.90	0.06-0.6	0.04-0.08	3.6-5.5	Low	0.17			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
WaB, WaC	0-29	2-15	1.60-1.75	6.0-20	0.05-0.08	4.5-6.0	Low	0.15	5	2	.5-2
Wagram	29-80	10-35	1.35-1.60	0.6-2.0	0.12-0.16	4.5-6.0	Low	0.20			
We	0-10	5-20	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24	5	3	.5-5
Wahee	10-39	35-60	1.40-1.60	0.06-0.2	0.12-0.20	3.6-5.5	Moderate	0.28			
	39-62	---	---	---	---	---	---	---			
WfB	0-11	5-10	1.45-1.60	6.0-20	<0.05	4.5-6.0	Low	0.10	5	1	.5-1
Wakulla	11-36	2-8	1.45-1.60	6.0-20	0.05-0.10	4.5-6.0	Low	0.10			
	36-96	2-8	1.45-1.60	6.0-20	<0.05	4.5-6.0	Low	0.10			
Wh	0-6	10-27	1.35-1.60	2.0-6.0	0.10-0.15	4.5-6.5	Low	0.24	5	3	2-5
Wehadkee	6-40	18-35	1.30-1.50	0.6-2.0	0.16-0.20	4.5-6.5	Low	0.32			
	40-80	---	---	---	---	---	---	---			
WkB, WkD	0-4	10-20	1.45-1.65	2.0-6.0	0.11-0.16	4.5-6.0	Low	0.24	5	3	.5-2
Wickham	4-19	18-35	1.30-1.50	0.6-2.0	0.12-0.17	4.5-6.0	Low	0.24			
	19-72	---	---	---	---	---	---	---			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AnB---------- Alpin	A	None	---	---	>6.0	---	---	>60	---	Low	High.
AtA---------- Altavista	C	Rare	---	---	1.5-2.5	Apparent	Dec-Apr	>60	---	Moderate	Moderate.
Au---------- Augusta	C	Rare	---	---	1.0-2.0	Apparent	Dec-May	>60	---	High	Moderate.
AyA, AyB---------- Aycock	B	None	---	---	4.0-6.0	Perched	Jan-Apr	>60	---	Moderate	High.
Bb---------- Bibb	D	Frequent	Brief to long.	Dec-May	0.5-1.5	Apparent	Dec-Apr	>60	---	High	Moderate.
BnB, BnD---------- Blaney	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
CaB, CaD---------- Candor	A	None	---	---	>6.0	---	---	>60	---	Low	Low.
CeB, CeD---------- Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ch*:											
Chewacla---------	C	Frequent	Brief to long.	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High	Moderate.
Congaree---------	B	Frequent	Brief	Nov-Apr	2.5-4.0	Apparent	Nov-Apr	>60	---	Moderate	Moderate.
Co---------- Coxville	D	None	---	---	0-1.5	Apparent	Nov-Apr	>60	---	High	High.
DoA, DoB, DtB----- Dothan	B	None	---	---	3.0-5.0	Perched	Jan-Apr	>60	---	Moderate	Moderate.
DyF. Dystrochrepts											
EnB, EnD---------- Enon	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
ExA---------- Exum	C	None	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
FaB, FuB---------- Fuquay	B	None	---	---	4.0-6.0	Perched	Jan-Mar	>60	---	Low	High.
GaA, GaB, GaD----- Gilead	C	None	---	---	1.5-2.5	Perched	Jan-Mar	>60	---	Moderate	High.
GoA---------- Goldsboro	B	None	---	---	2.0-3.0	Apparent	Dec-Apr	>60	---	Moderate	High.
Gr---------- Grantham	D	None	---	---	0-1.0	Apparent	Dec-May	>60	---	High	High.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
HaB---------- Helena	C	None----------	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	High-----	High.
LaB---------- Lakeland	A	None----------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
LnB, LnD, LnE----- Lillington	B	None----------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
LoF---------- Louisa	B	None----------	---	---	>6.0	---	---	10-20	Soft	Low------	Moderate.
Ly---------- Lynchburg	C	None----------	---	---	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	High.
MaA, MaB---------- Marlboro	B	None----------	---	---	>6.0	---	---	>60	---	High-----	High.
Na---------- Nahunta	C	None----------	---	---	1.0-2.5	Apparent	Dec-May	>60	---	High-----	High.
NeD, NeE---------- Nason	C	None----------	---	---	>6.0	---	---	40-60	Soft	Moderate	High.
NoA, NoB, NoC----- Norfolk	B	None----------	---	---	4.0-6.0	Apparent	Jan-Mar	>60	---	Moderate	High.
NuB*:											
Norfolk----------	B	None----------	---	---	4.0-6.0	Apparent	Jan-Mar	>60	---	Moderate	High.
Urban land.											
OrB---------- Orangeburg	B	None----------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
PaE---------- Pacolet	B	None----------	---	---	>6.0	---	---	>60	---	High-----	High.
Pc---------- Pactolus	A	Rare----------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Low------	High.
Pd*:											
Pits.											
Dumps.											
Pf---------- Pocalla	A	None----------	---	---	>4.0	Perched	Dec-Mar	>60	---	Low------	High.
Pn---------- Polawana	A/D	Frequent----	Very long	Dec-Mar	+1-0.5	Apparent	Nov-Apr	>60	---	High-----	High.
Ps---------- Portsmouth	B/D	Rare----------	---	---	0-1.0	Apparent	Nov-May	>60	---	High-----	High.
Ra---------- Rains	B/D	None----------	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High-----	High.
Rb*:											
Rains----------	B/D	None----------	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High-----	High.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Rb*: Urban land.											
Ro---------- Roanoke	D	Occasional	Brief-----	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High-----	High.
StA---------- State	B	Rare--------	---	---	4.0-6.0	Apparent	Dec-Jun	>60	---	Moderate	High.
To---------- Toisnot	D	None--------	---	---	+.5-1.0	Apparent	Dec-Apr	>60	---	High-----	High.
VaB, VaD, VeB, VeD, VeE--------- Vaucluse	C	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
WaB, WaC---------- Wagram	A	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
We---------- Wahee	D	Occasional	Very brief to brief.	Dec-Apr	0.5-1.5	Apparent	Dec-Mar	>60	---	High-----	High.
WfB---------- Wakulla	A	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Wh---------- Wehadkee	D	Frequent----	Brief to long.	Nov-Jun	0-1.0	Apparent	Nov-May	>60	---	High-----	Moderate.
WkB, WkD---------- Wickham	B	Rare--------	---	---	>6.0	---	---	>60	---	Moderate	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alpin	Thermic, coated Typic Quartzipsamments
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Augusta	Fine-loamy, mixed, thermic Aeric Endoaquults
Aycock	Fine-silty, siliceous, thermic Typic Paleudults
Bibb	Coarse-loamy, siliceous, acid, thermic Typic Fluvaquents
Blaney	Loamy, siliceous, thermic Arenic Hapludults
Candor	Sandy, siliceous, thermic Arenic Paleudults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Congaree	Fine-loamy, mixed, nonacid, thermic Typic Udifluvents
Coxville	Clayey, kaolinitic, thermic Typic Paleaquults
Dothan	Fine-loamy, siliceous, thermic Plinthic Paleudults
Enon	Fine, mixed, thermic Ultic Hapludalfs
Exum	Fine-silty, siliceous, thermic Aquic Paleudults
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Gilead	Clayey, kaolinitic, thermic Aquic Hapludults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Grantham	Fine-silty, siliceous, thermic Typic Paleaquults
Helena	Clayey, mixed, thermic Aquic Hapludults
Lakeland	Thermic, coated Typic Quartzipsamments
Lillington	Loamy-skeletal, siliceous, thermic Typic Hapludults
Louisa	Loamy, micaceous, thermic, shallow Ruptic-Ultic Dystrochrepts
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Marlboro	Clayey, kaolinitic, thermic Typic Paleudults
Nahunta	Fine-silty, siliceous, thermic Aeric Paleaquults
Nason	Clayey, mixed, thermic Typic Hapludults
Norfolk	Fine-loamy, siliceous, thermic Typic Paleudults
Orangeburg	Fine-loamy, siliceous, thermic Typic Paleudults
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Pactolus	Thermic, coated Aquic Quartzipsamments
Pocalla	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Polawana	Sandy, mixed, thermic Cumulic Humaquepts
Portsmouth	Fine-loamy over sandy or sandy-skeletal, mixed, thermic Typic Umbraquults
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
Roanoke	Clayey, mixed, thermic Typic Endoaquults
State	Fine-loamy, mixed, thermic Typic Hapludults
Toisnot	Coarse-loamy, siliceous, thermic Typic Fragiaquults
Vaucluse	Fine-loamy, siliceous, thermic Typic Hapludults
Wagram	Loamy, siliceous, thermic Arenic Paleudults
Wahee	Clayey, mixed, thermic Aeric Endoaquults
Wakulla	Sandy, siliceous, thermic Psammentic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents
Wickham	Fine-loamy, mixed, thermic Typic Hapludults

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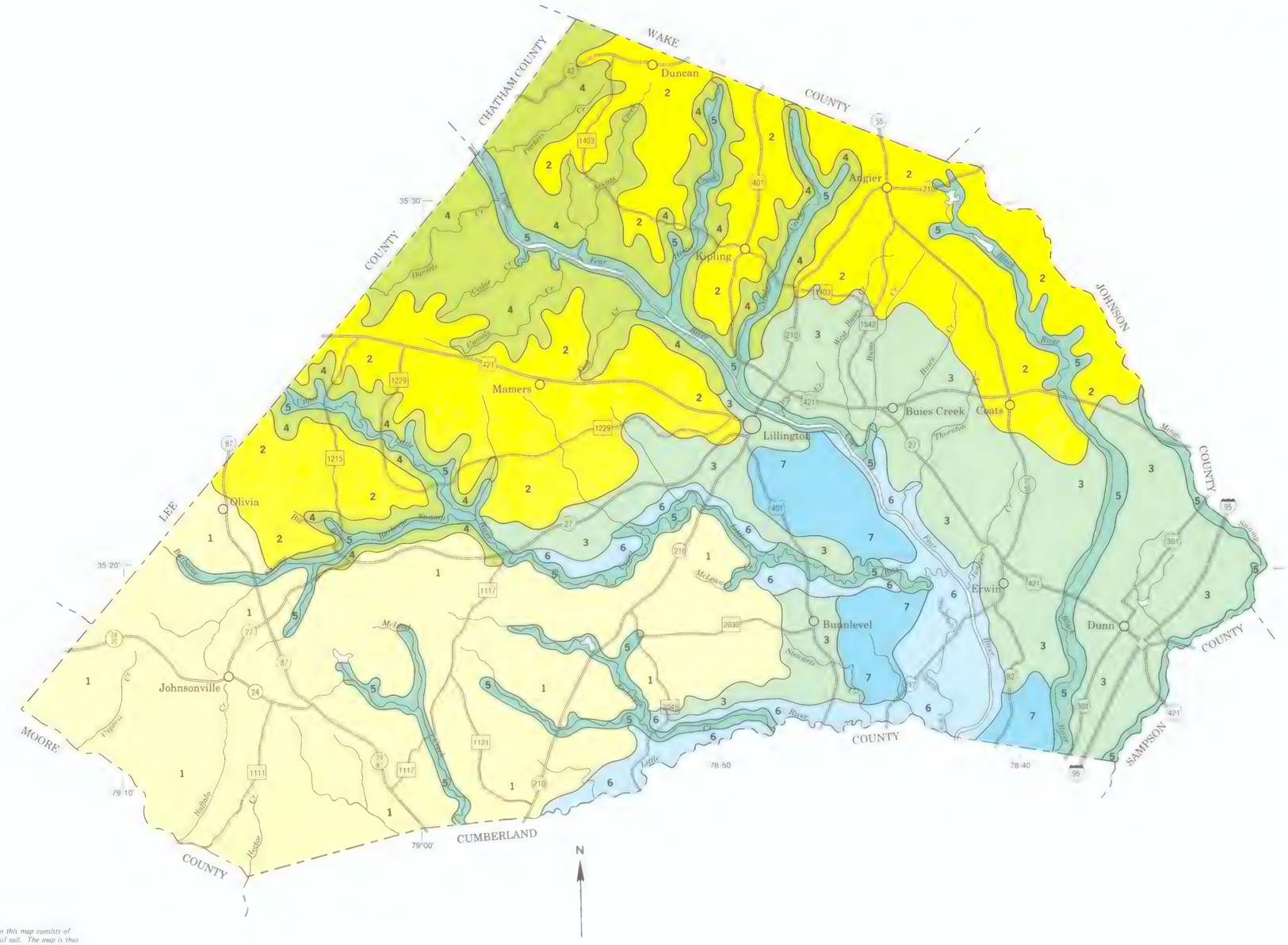


SOIL LEGEND*

1	GILEAD-BLANEY-CANDOR
2	DOTHAN-FUQUAY-GILEAD
3	NORFOLK-WAGRAM-RAINS
4	CECIL-PACOLET-NASON
5	BIBB-WEHADKEE
6	ROANOKE-WICKHAM-ALTAVISTA
7	EXUM-AYCOCK-NAHUNTA

*The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1992

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH, AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE
HARNETT COUNTY BOARD OF COMMISSIONERS

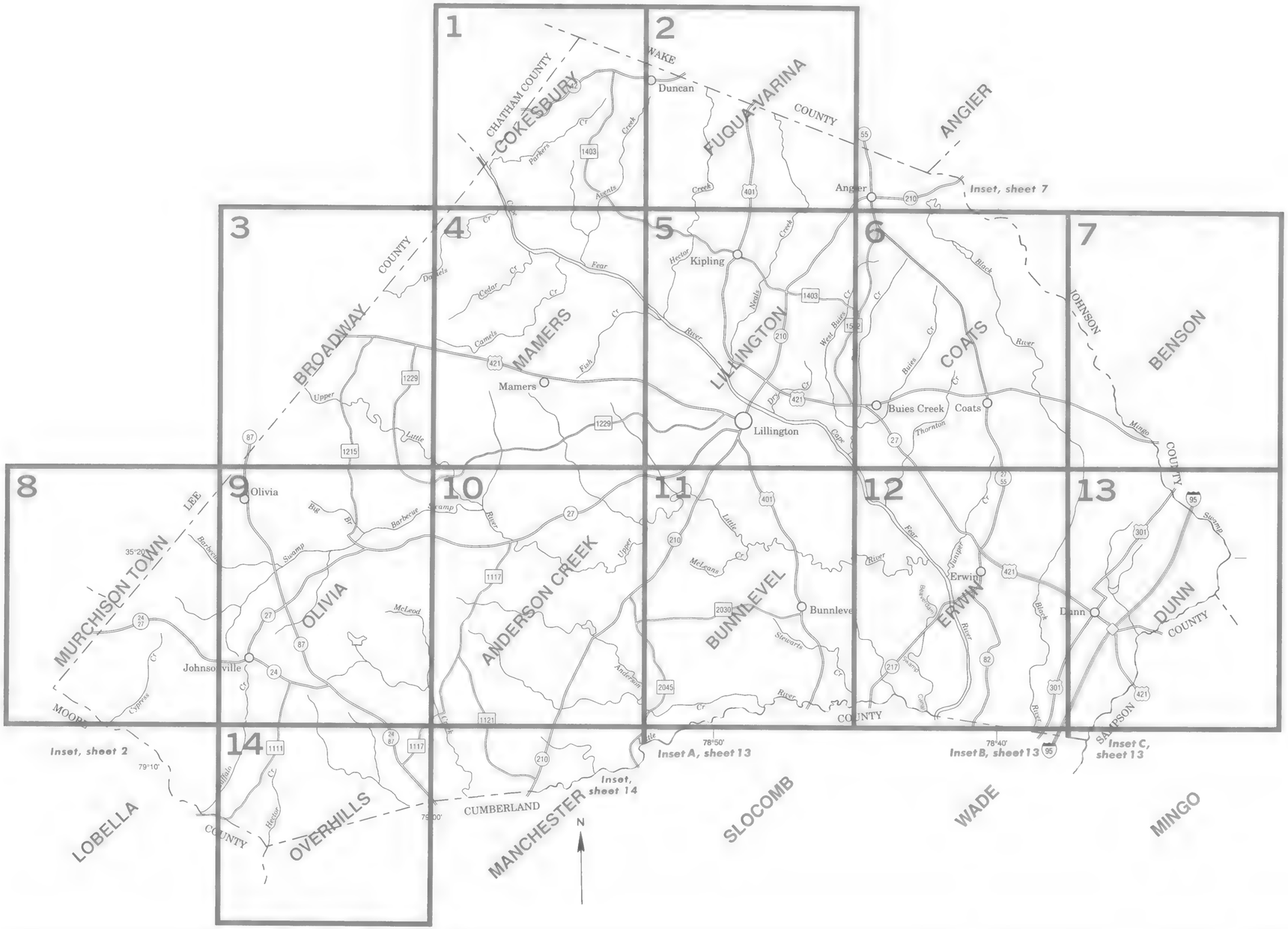
GENERAL SOIL MAP

HARNETT COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

HARNETT COUNTY, NORTH CAROLINA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HARNETT COUNTY, NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH, AND NATURAL RESOURCES
NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA COOPERATIVE EXTENSTION SERVICE
HARNETT COUNTY BOARD OF COMMISSIONERS

SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a small letter. The third letter, if used, is always a capital and shows the slope. Symbols without slope letters are those of nearly level soils or miscellaneous areas.

SYMBOL	NAME
AnB	Alpin sand, 0 to 6 percent slopes
AtA	Altavista fine sandy loam, 0 to 3 percent slopes, rarely flooded
Au	Augusta fine sandy loam, rarely flooded
AyA	Aycock silt loam, 0 to 2 percent slopes
AyB	Aycock silt loam, 2 to 6 percent slopes
Bb	Bibb loam, frequently flooded
BnB	Blaney loamy sand, 2 to 8 percent slopes
BnD	Blaney loamy sand, 8 to 15 percent slopes
CaB	Candor sand, 0 to 8 percent slopes
CaD	Candor sand, 8 to 15 percent slopes
CeB	Cecil fine sandy loam, 2 to 8 percent slopes
CeD	Cecil fine sandy loam, 8 to 15 percent slopes
Ch	Chewacla and Congaree loams, frequently flooded
Co	Coxville loam
DoA	Dothan loamy sand, 0 to 2 percent slopes
DoB	Dothan loamy sand, 2 to 6 percent slopes
DtB	Dothan gravelly loamy sand, 0 to 6 percent slopes
DyF	Dystrochrepts, steep
EnB	Enon fine sandy loam, 2 to 8 percent slopes
EnD	Enon fine sandy loam, 8 to 15 percent slopes
ExA	Exum very fine sandy loam, 0 to 2 percent slopes
FaB	Fuquay loamy sand, 0 to 6 percent slopes
FuB	Fuquay gravelly loamy sand, 0 to 6 percent slopes
GaA	Gilead loamy sand, 0 to 2 percent slopes
GaB	Gilead loamy sand, 2 to 8 percent slopes
GaD	Gilead loamy sand, 8 to 15 percent slopes
GoA	Goldsboro loamy sand, 0 to 2 percent slopes
Gr	Grantham loam
HaB	Helena fine sandy loam, 2 to 8 percent slopes
LaB	Lakeland sand, 0 to 8 percent slopes
LnB	Lillington gravelly sandy loam, 2 to 8 percent slopes
LnD	Lillington very gravelly sandy loam, 8 to 15 percent slopes
LnE	Lillington very gravelly sandy loam, 15 to 25 percent slopes
LoF	Louisa fine sandy loam, 25 to 45 percent slopes
Ly	Lynchburg sandy loam
MaA	Marlboro sandy loam, 0 to 2 percent slopes
MaB	Marlboro sandy loam, 2 to 6 percent slopes
Na	Nahunta loam
NeD	Nason silt loam, 8 to 15 percent slopes
NeE	Nason silt loam, 15 to 25 percent slopes
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 6 percent slopes
NoC	Norfolk loamy sand, 6 to 10 percent slopes
NuB	Norfolk-Urban land complex, 0 to 6 percent slopes
OrB	Orangeburg loamy sand, 2 to 6 percent slopes
PaE	Pacolet fine sandy loam, 15 to 25 percent slopes
Pc	Pactolus loamy sand, rarely flooded
Pd	Pits-Dumps complex
Pf	Pocalla loamy sand, 0 to 6 percent slopes
Pn	Polawana loamy sand, frequently flooded
Ps	Portsmouth loam, rarely flooded
Ra	Rains sandy loam
Rb	Rains-Urban land complex
Ro	Roanoke loam, occasionally flooded
StA	State fine sandy loam, 0 to 3 percent slopes, rarely flooded
To	Toisnot loam
VaB	Vaucluse loamy sand, 2 to 8 percent slopes
VaD	Vaucluse loamy sand, 8 to 15 percent slopes
VeB	Vaucluse gravelly loamy sand, 2 to 8 percent slopes
VeD	Vaucluse gravelly loamy sand, 8 to 15 percent slopes
VeE	Vaucluse gravelly loamy sand, 15 to 25 percent slopes
WaB	Wagram loamy sand, 0 to 6 percent slopes
WaC	Wagram loamy sand, 6 to 10 percent slopes
We	Wahee fine sandy loam, occasionally flooded
WtB	Wakulla sand, 0 to 8 percent slopes
Wh	Wehadkee loam, frequently flooded
WkB	Wickham fine sandy loam, 0 to 6 percent slopes, rarely flooded
WkD	Wickham fine sandy loam, 6 to 15 percent slopes, rarely flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate
- Federal US
- State NC
- Secondary SR

RAILROAD Name only

POWER TRANSMISSION LINE
(normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or Small

PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban area)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

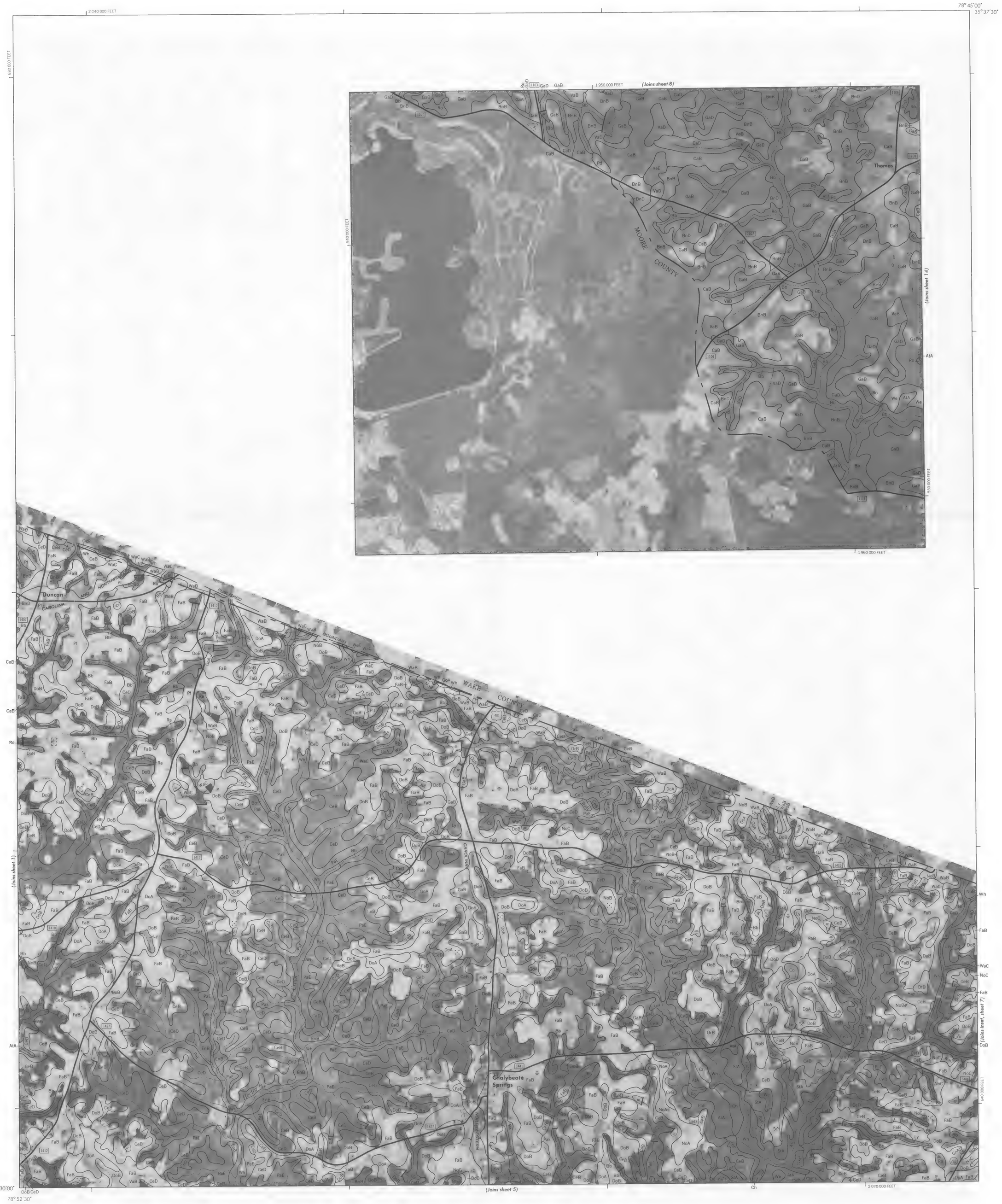
SHEET NUMBER 1
HARNETT COUNTY, NORTH CAROLINA

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

HARNETT COUNTY, NORTH CAROLINA NO. 1

N



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1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 2

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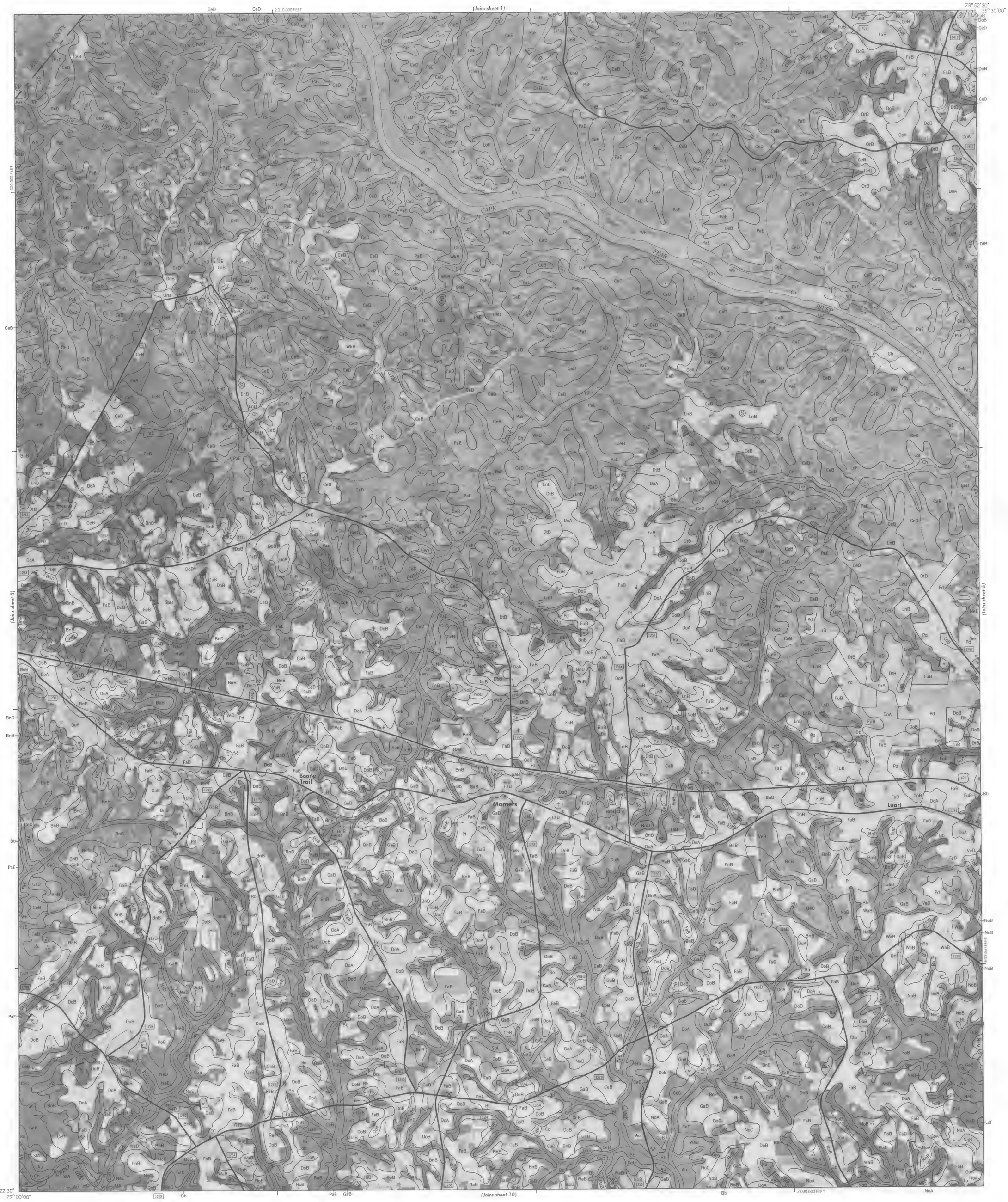
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 3



This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

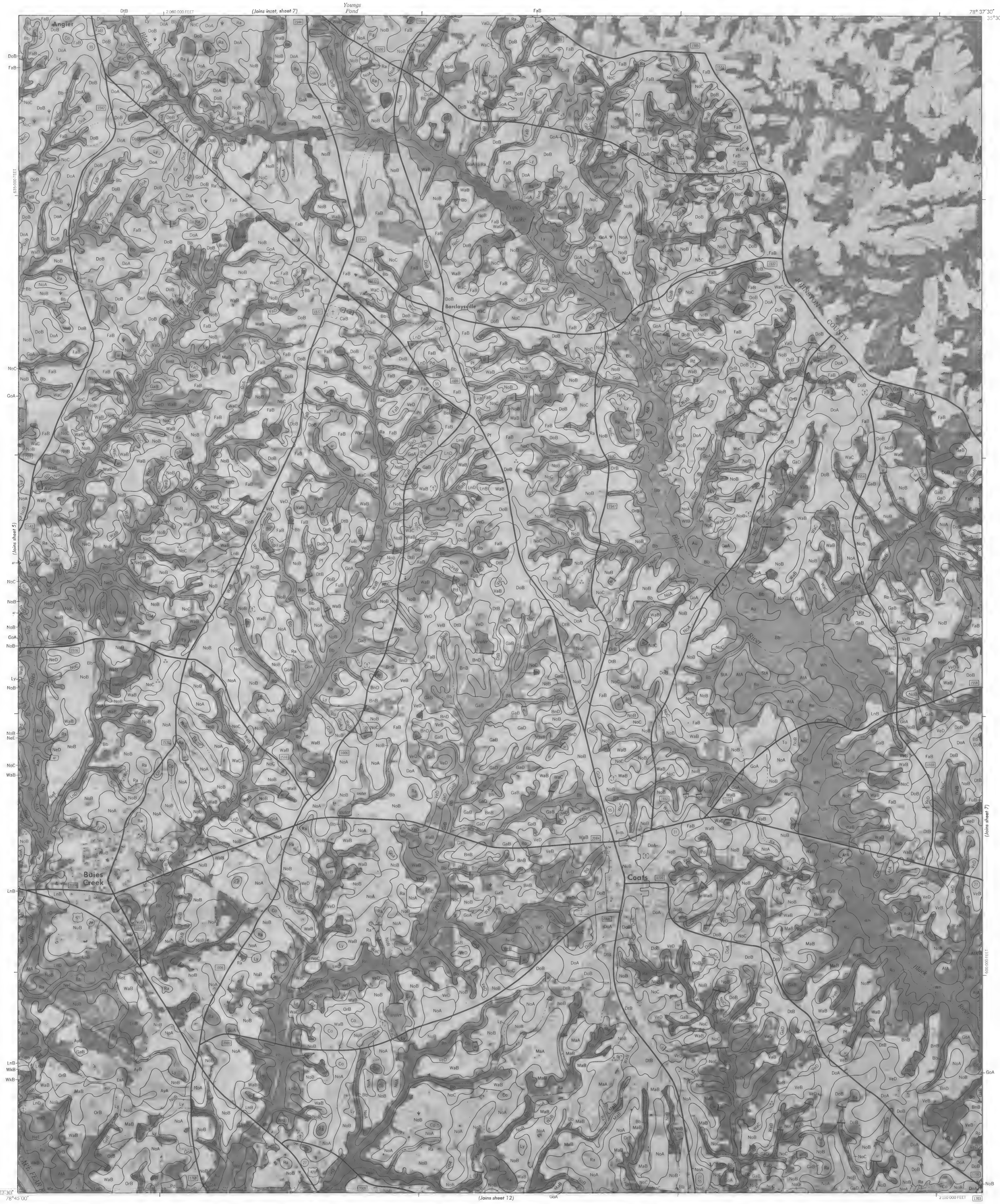
HARNETT COUNTY, NORTH CAROLINA NO. 4

N

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

HARNETT COUNTY, NORTH CAROLINA NO. 5



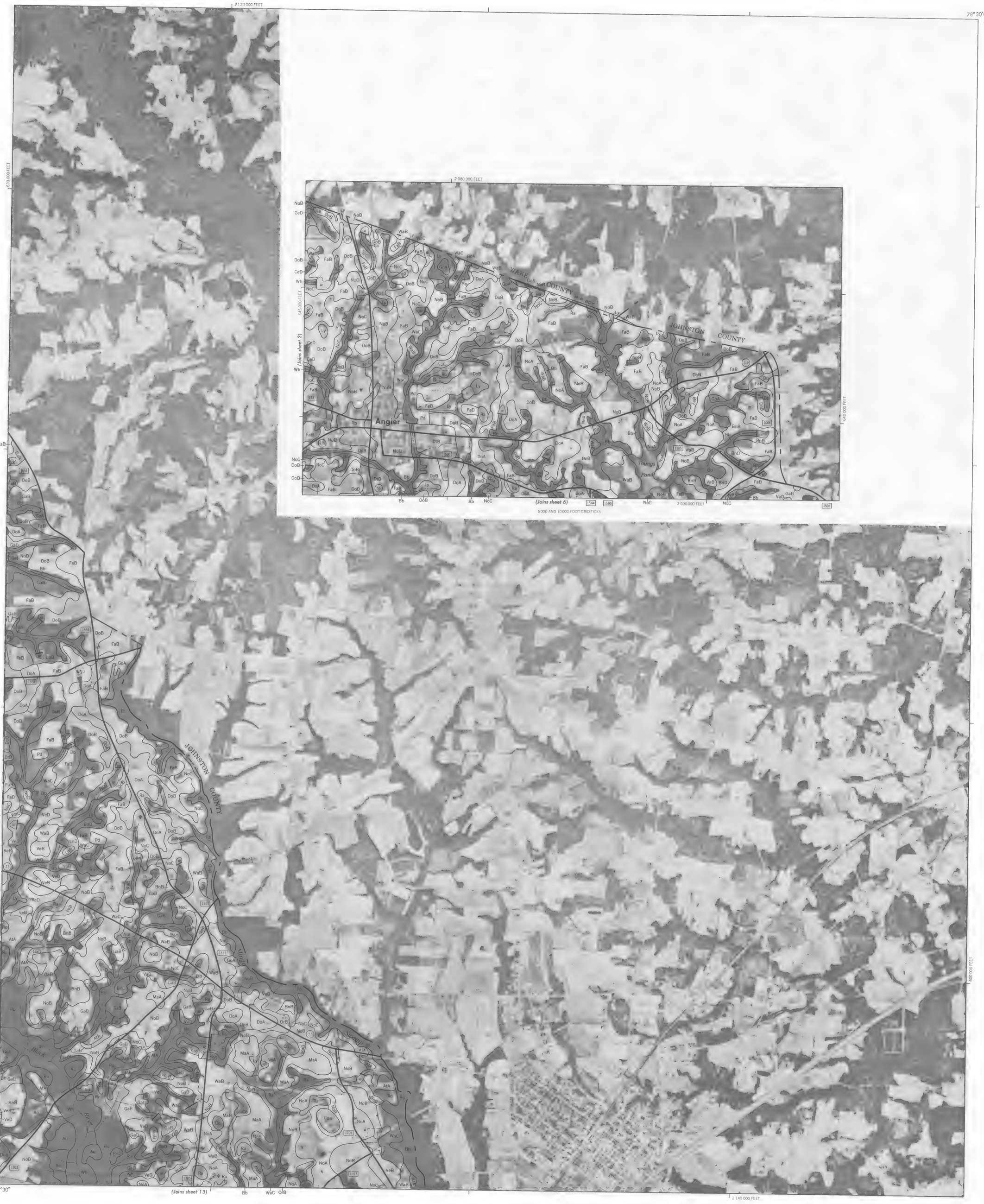
This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers

Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 6



This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 7

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

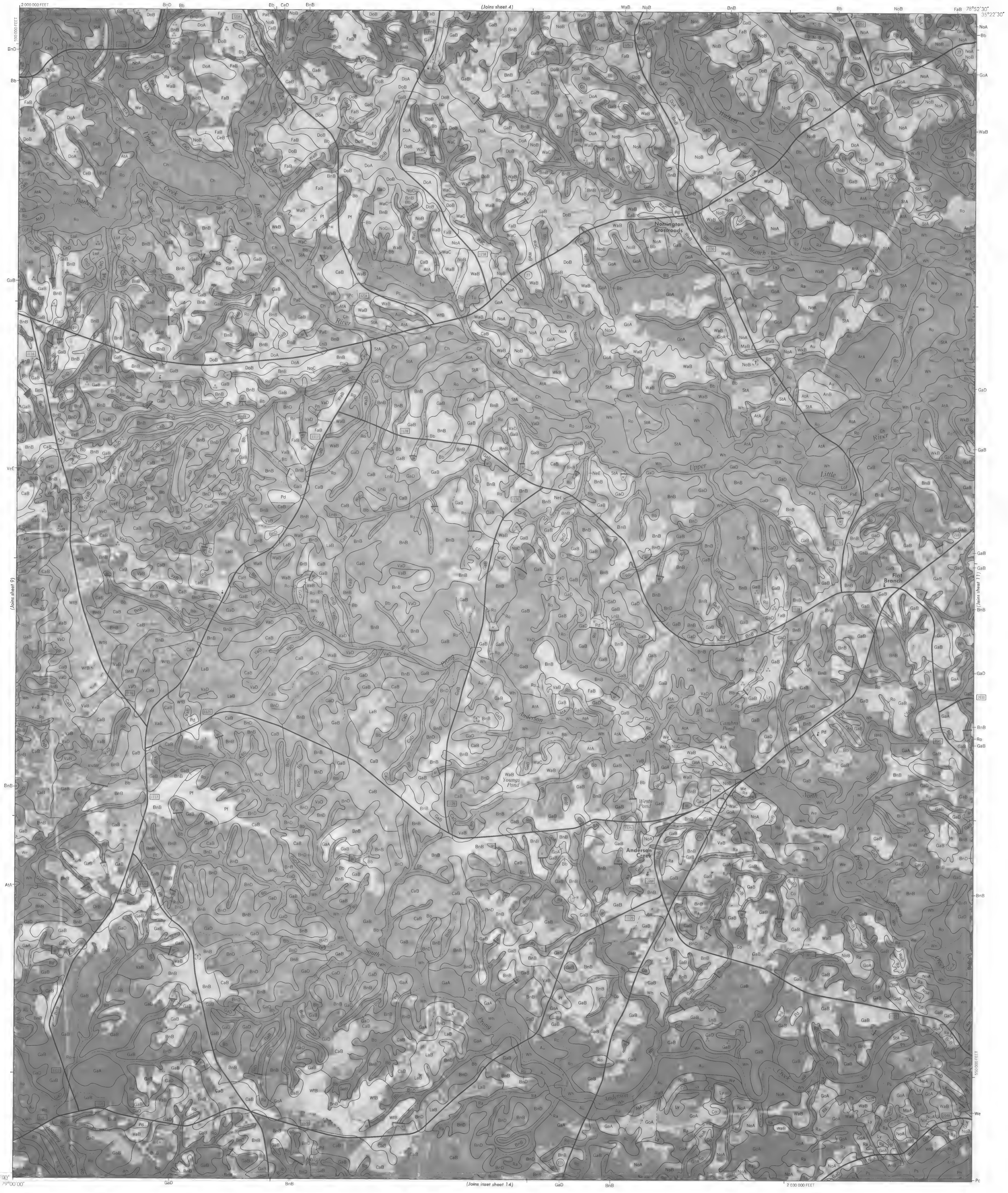
HARNETT COUNTY, NORTH CAROLINA NO. 8

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 9



This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 10

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 11
HARNETT COUNTY, NORTH CAROLINA

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 11

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

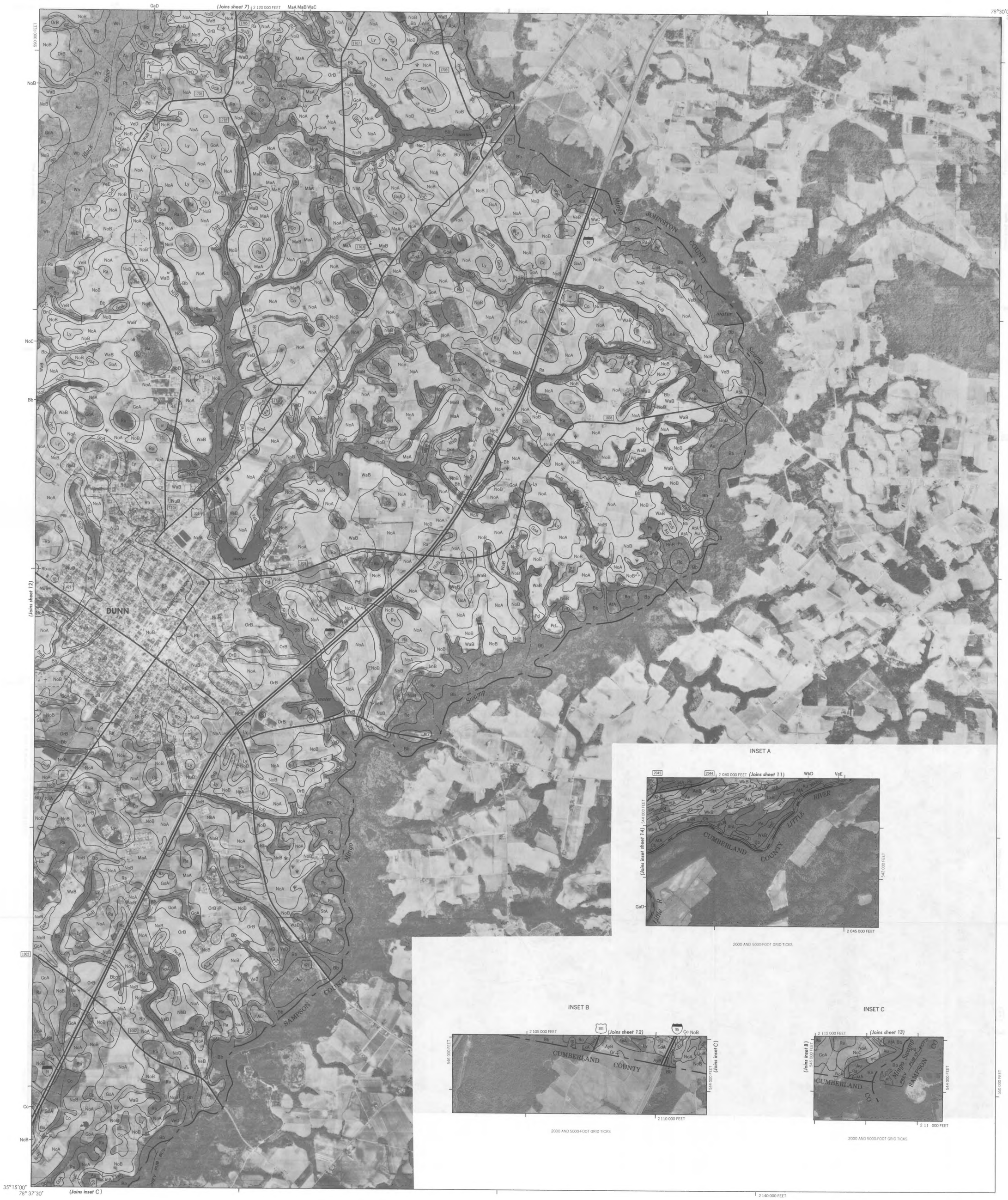
5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

HARNETT COUNTY, NORTH CAROLINA NO. 12

N

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NUMBER 13
HARNETT COUNTY, NORTH CAROLINA



This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 13

SHEET NO. 13 OF 14

79°00'00"
35°15'00"
1 970 000 FEET
540 000 FEET
530 000 FEET
1 990 000 FEET
(Joins sheet 9)
(Joins inset, sheet 2)
(Joins lower left)
MaB
MOORE COUNTY
CUMBERLAND COUNTY
Overhills
Overhills Lake
Hector Creek
Buffalo Creek
water

78°52'30"
35°15'00"
2 000 000 FEET
2 030 000 FEET
(Joins sheet 10)
(Joins upper right)
CUMBERLAND CO (Joins in A, sheet 13)
Jumping Run Creek
Lake Holton
Twin Lakes
Lake McKay
LITTLE RIVER
CUMBERLAND COUNTY

This map was compiled by U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies on 1973 and 1976 photography obtained from U.S. Department of Interior, Geological Survey.

5000 4000 3000 2000 1000 0 5000 10000 Feet
1 .5 0 1 2 3 Kilometers
Scale - 1:24000

N

HARNETT COUNTY, NORTH CAROLINA NO. 14